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Vol. III

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1937

No. 636

ELECTRIC BOND AND SHARE COMPANY, AMERICAN GAS AND ELECTRIC COMPANY AND AMERICAN POWER & LIGHT COMPANY, ET AL., PETITIONERS,

vs.

SECURITIES AND EXCHANGE COMMISSION, HOMER S. CUMMINGS, INDIVIDUALLY AND AS ATTORNEY GENERAL OF THE UNITED STATES, ET AL.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT

PETITION FOR CERTIORARI FILED DECEMBER 14, 1937.

CERTIORARI GRANTED JANUARY 3, 1938.

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VOLUME III.

ARTICLE XVIII.

1402

GENERAL DESCRIPTION OF PHYSICAL OPERATION OF ELECTRIC UTILITY COMPANIES.

119. *Production, Transmission and Distribution.*

A. In its physical and mechanical aspects, the business of producing electric power and energy and distributing it for sale may be analyzed, on the basis of common accounting and engineering practice, into three interrelated and practically simultaneous
1403 processes, as follows:

(1) Generation or production — conversion of the mechanical energy of falling water or the heat energy of fuel into electric energy by means of mechanical devices and apparatus.

(2) Transmission — conveyance of the energy thus produced to a distribution center.

(3) Distribution—delivery of energy to the individual consumer.

1404 There are usually intermediate processes which, however, are merely auxiliary to the essential processes above described. Among the most important of these is that of increase or decrease of "voltage" (pressure) accomplished by means of "transformers". Generation is usually accomplished at a moderate voltage (2,300 to 14,000 volts), long distance transmission at a high voltage (44,000 to 220,000 volts) and ordinary use for industrial or

domestic purposes usually at a low voltage (110 to 2,300 volts). 1405

B. The generating facilities of an electric public utility consist of stations, either fuel or hydro-electric, where electric energy is "produced" by the conversion process from water or fuel energy and delivered at the station bus bar through wires connecting the generator terminals and the bus bar. From the bus bar, wires or other conductors carry the energy to transformers through which the voltage of generation is increased to one or more voltages suitable for transmission to central points in the areas of use. At such central points, other transformers are interposed at a "substation" where the voltage is again changed to that suitable for distribution. 1406

C. In the process of transmission, further changes of voltage by means of transformers may be necessary, both in the operation of the individual company system or in the course of sales at wholesale, or interchange between the systems of different companies. At central distribution points or "substations" and at further points in the system where individual consumers are served, voltage is again changed through interposition of transformers for distribution to consumers at the one or more secondary voltages adapted to their individual needs. 1407

D. In individual systems there are numerous variations in the form and importance of the functions of transmission and distribution. At one extreme is the local plant which is built in the city

served and from which energy may be, and fre-
1408 quently is, directly distributed at the voltage of generation throughout the city, with transformers interposed incidentally as conditions require for the various classes of local service. Thus, what may be termed primary lines may run to different sections of the city at a voltage of 4,000 or 11,000 volts, or higher voltage, as feeder lines, with final distribution to small consumers taking place at a lower voltage, ordinarily 220-110 volts, suitable for use in the consumers' appliances. At the other extreme, power plants, either hydro or fuel, belonging to a single company, are located at distances many miles
1409 apart covering a whole section of a state or contiguous sections of adjoining states, connected by hundreds of miles of main or trunk transmission lines with distribution substations located at hundreds of communities served. In such a system, the back-bone, or main trunk transmission lines, may operate at 110,000, 132,000, 154,000 or 220,000 volts with secondary transmission lines operating at 44,000 or 66,000 volts, the voltage generally being roughly related to the mileage of transmission and the amount of power to be transmitted, greater distances and larger loads requiring, for economi-
1410 cal transmission, the higher voltages. In such a system, having industrial as well as ordinary domestic uses or "loads", primary distribution voltages as high as 22,000, 26,000 or 33,000 volts may be employed. Large industries requiring large amounts of electric power are at times served directly from a primary or secondary transmission line through transformers (which may be furnished either by the company or the customer, depending upon the terms of the particular contract) whose

capacities and voltage relations are determined by the requirements of the particular customer. 1411

120. *System Capacity Requirements*

Storage or delay in delivery of energy generated in an alternating current system is impossible. The demand for electric energy imposed on any system is constantly subject to instantaneous and wide fluctuations, not only from a season or long term point of view, but during any hour or minute of the day. Consequently, the system must at all times be prepared in all its parts completely to respond instantaneously to change in both the demands of the 1412
individual consumers and the aggregate of all such demands. Thus, if the simultaneous or "peak" load which may be imposed by all consumers on the system is 50,000 kilowatts, and the average load is but 25,000 kilowatts, there must be generating, transmission and distribution capacity available at all times to carry the 50,000 kilowatt peaks whenever they may occur. Transmission and distribution capacity are determined by size of wire and voltage and number of circuits. Plant capacity is obtained by having available at the station or 1413
stations an aggregate of installed turbine and generating capacity with an adequate source of supply equal to the peak demand, and spare capacity sufficient to take care of outages of units and, in the case of hydro plants, to take care of water shortage. Thus, for illustration, for a 50,000 kilowatt peak load and an average load of 25,000 kilowatts, there might be installed three twenty-five thousand-kilowatt turbo-generators of which two would be kept in regular operation so as instantly to respond to

consumers' demands up to the peak load, and the
1414 third maintained, frequently in a running condition, ready to be put promptly into operation in the event of the failure of one of the other two. The extent of spare or reserve capacity (in a hydroelectric system, often governed by water conditions, the capacity of reservoirs, etc.) is dictated not only by considerations of business policy, in order that the system may be in a position to respond to fluctuations in demand and to allow for future growth, but also by the obligation of the system as a public utility to provide adequate, dependable service. Such breakdowns or outages of units as
1415 might reasonably be anticipated must be provided against, by adequate spare or reserve capacity, to meet the peak demand of the system when one or more of the largest generating units are out of service. Such considerations likewise affect what are regarded as the requisite transmission and distribution capacity requirements of a system. It is the general practice of utilities, in building transmission lines under modern conditions, to have alternative means of transmission from different generating sources to the major distribution centers of the system, and the aggregate capacity of transmission
1416 lines from all sources of supply commonly exceeds the peak load of the system.

121. *Synchronous System Operation*

The generating capacity in the case of a system serving a closely restricted area ordinarily consists of separate units in a single station, but in the case of a large system would be in many different stations located at suitable sources of energy supply

(water or fuel) at different places in the system. But whether all capacity is operated in a single station or in many stations, all active stations, and all the units therein, are operated as though in a single plant, from a central point of control, in synchronism with each other and responsive as a whole to the various demands made by consumers upon the system, regardless of the distant locations of the plants. Synchronism, as that term is used herein, requires that all generators on a single system or on several interconnected systems generate alternating current of exactly the same frequency. Synchronous operation further requires that the interconnecting paths between the parts of an interconnected system be of capacity adequate to handle the inevitable equalizing swings of current between the several parts, and that the circuit breakers and other control apparatus throughout the interconnected system be of a type and capacity adequate for the heavy duties imposed upon them by short circuits and other emergency currents, the magnitude of which is determined in part by the aggregate interconnected generating capacity. It is generally possible to achieve such synchronism between modern systems, where interconnecting transmission capacity is adequate, even where such systems were not constructed with such synchronous operation in view, by adjustments in the speed of rotation of the generators of the two systems and by the installation of adequate control apparatus, sometimes requiring a large capital investment. Such a system is under the control of a "dispatcher" who keeps constantly in touch with all stations, and instructs the operators to connect or disconnect the

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various generating units as the load increases or
1420 decreases in the course of each day. Electric service consists in the continuous maintenance of an electrical state of voltage and frequency at each consumer's meter, available there for instant delivery of energy when called for by use.

122. *Interconnected Systems*

A. Frequently the utility systems of different companies are physically interconnected. The properties may all be operated in synchronism as parts of a "power pool", operations being controlled by
1421 a common load dispatcher or cooperatively through constant intercourse between the dispatchers of the various companies. In other situations, the physical interconnection may be maintained simply for special or limited purposes in which case the properties need not be operated in synchronism except during the periods that interchange or transmission of energy is taking place.

B. Although the systems of different companies are frequently interconnected, there is no known case of the use of a transmission line as a common
1422 carrier (i.e. a carrier which holds itself out to transmit energy for the account of all comers within the limits of its capacity), and companies which transmit for the account of others usually limit and define their obligations in this respect by definite contract provisions. In the case of affiliated companies, these arrangements are sometimes of an informal kind. As hereinabove described, the generating, transmission and distribution capacity of a system is adapted to the existing and anticipated

load conditions and electric energy can neither be stored nor its delivery delayed. If the 1423
maximum capacity of lines in the transmission network is merely sufficient to carry the existing load, with the requisite spare transmission capacity, the system could not undertake to transmit energy for the account of others without increasing its transmission capacity. Such activities would not only overload the transmission lines but might create disequilibrium in the operation of the system. However, where and while sufficient margin of capacity exists, such activities could be undertaken by a system within the limits of such margin, without
fundamental readaptation of methods of operation, 1424
provided control apparatus in all the systems involved were adequate for the new conditions of operation.

123. *Tracing Energy in System or Power Pool Operation*

In the operation of an interconnected system or power pool, although it is possible to determine the proportionate contribution of specific generating sources to the total energy available in the system and the proportionate consumption within spe- 1425
cific distribution areas to total consumption throughout the system, it is often impossible to trace accurately the source of any specific energy which may be metered as passing along a certain transmission line or as arriving at a certain distribution point, and, likewise, it is often impossible to trace to its destination energy generated at a specific source. Different generating plants may feed the same transmission line leading to a load center,

and different distribution lines may tap the same
1426 line before it reaches that center. The capacity and voltage of the lines are additional factors which may influence the source or destination of specific energy. Utility companies do not attempt to trace completely the flow of energy in the operation of their systems and do not keep their records in such a way as to make such detailed analysis practicable, except by methods which involve estimates as opposed to mathematical computation. Because such determination is impracticable, it is the usual practice in rate cases, where the properties in the system of the company concerned serve other communities
1427 besides that for which rates are to be determined, to allocate some portion of the total properties in the system as rendering service in the community where the rate problem arises, rather than to attempt to identify those plants and transmission lines in the system which serve the community.

124. *Historical Development of Systems and Interconnections*

A. Historically, the electric utility industry developed from local companies serving a single city
1428 or town. In the progress of the art, which developed economies in larger generating units and reduced the problems of long distance transmission, neighboring cities and towns were brought together within a constantly expanding area, until single companies, in some cases, serve hundreds of cities and towns in a single state or in adjoining states.

B. This development of local properties into larger systems and the development of more exten-

sive transmission networks within and between systems took place in response to engineering, economic and financial considerations. Unless there is some local law which requires incorporation of parts of the business in each state, a single company frequently carries on electric utility operations throughout an area in two or more contiguous states. In such cases the company's transmission lines, and distribution systems, have developed without attention to state boundaries, and have been built back and forth across state lines. Likewise, interconnections between different systems, whether associated or non-associated, have developed largely without regard to state boundaries, except insofar as the point of interconnection might conveniently be designated as a point at or near the state boundary. A map entitled "Service Areas of the Principal Electric Utility Systems in the United States" prepared by the Federal Power Commission is submitted herewith as Exhibit 110 and may be accepted, so far as material, as showing substantially the territorial areas served by electric utility subsidiaries of principal holding companies.

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125. *Location of Generating Facilities*

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A. Electric energy may be generated any place where falling water is available or fuel may be obtained. The location of the generating station in relation to market depends entirely upon economic factors. Other things being equal, steam electric generating stations serving large centers of population are usually located at or near such centers so as to avoid or economize on the expense of transmission. Hydro-stations, on the other hand, can

seldom be located near large centers of population
1432 as waterfalls in or near cities are not common. Furthermore, as the art of transmission has progressed, and as the tendency has grown to increase the service area of individual companies or groups of related companies, steam plants, as well as hydro-plants, have frequently been located at greater distances from the market, but steam plants have, on the other hand, frequently been built at or near load centers to insure against service interruptions and reduce transmission costs. From the point of view of the individual company or group of related companies, economies may result from the use
1433 of large capacity generating units which need broad market outlets. In addition, other factors such as lower land costs, reduced taxes and, in the case of steam plants, the availability of cheap fuel and of water for condensing purposes, have influenced the location of plants at distances from their load centers. Offsetting factors include the costs and possible service interruptions involved in long distance transmission, as well as recent improvements in design of small stations which may reduce the direct economic advantages of large over small
1434 units and stations.

B. However, it still remains possible, if comparative economies be disregarded, to generate and distribute electric energy entirely within the boundaries of a single community served, or within the boundaries of a single state, and it would be possible, likewise disregarding economies, to reconstruct and adapt any system which presently crosses state boundaries so as to confine its generating, transmitting and distributing agencies to a particu-

lar state. In other words, transmission of electric energy across state boundaries is not in theory a 1435
necessary characteristic of the electric public utility business, although extensive interstate transmission networks have been developed for reasons of economy.

126. *Long Distance Transmission*

There is perhaps no distinctly predictable limit to the distance which electric energy is likely to be transmitted in the future. In the present state of the art, electric energy is successfully and sometimes economically transmitted in large amounts 1436
for distances of upwards of one hundred and fifty miles from the location of the power plants producing the energy to distribution centers, without substantial intervening sources of supply or substantial intervening deliveries. On the other hand, where there are substantial intervening sources of supply, or substantial sources exist at or near the terminus of the line, so as to maintain adequate voltage regulation throughout the line, present day transmission may extend for considerably greater distances, which, without attempting to state a limit, may be approximated at from two hundred to two hundred 1437
and fifty miles. Within these physical limitations, the question is one of economics in which are involved the cost and value of the electric energy at destination in competition with energy which is or might be developed there. As the distance of transmission is increased, the size of the conductor and the voltage of the line must be increased, and condensers and other special regulatory and stabilizing equipment must be provided, all involving and

introducing added investment and operating costs.
1438 Furthermore, most of the losses involved in transmission are proportional to the distance of transmission and materially affect economies of long distance transmission. While a single company or group of companies may have a continuous system of transmission of uniform voltage a thousand miles long operating synchronously, so that it is theoretically possible that some energy could under theoretical conditions of operation travel from one end of the line to the other, yet in practical operation such a line is fed from numerous plants throughout its length and energy flows back and forth over
1439 particular sections of the line to meet the demands of the particular portions of the territory which are served from those sections.

127. *Reasons for and Relative Significance of Interconnection within and between Systems*

A. In either hydro or fuel plant operations, overall economy of production is improved by increase in the "capacity factor" at which the plant operates (i. e. the ratio of average level of operation to total capacity of plant). There has also generally been
1440 an increase in overall economies of production by increasing the size of the generating units, and, within limits, by increasing the capacity of the plant as a whole. These factors have entered into the question of plant location as a counterbalance against the expense of long distance transmission.

B. In addition, the desire to obtain one or more of the following objectives are major factors which account for the development of interconnections within and between systems:

(1) System load diversity

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(2) Economy transactions

(3) Emergency or reserve capacity

(1) If the peak periods of adjacent systems or parts of the same systems occur at different times, interconnection eliminates the necessity for generating capacity to the extent of the diversity and hence makes possible substantial savings in capital costs of generating stations. For instance, if two companies each have peak loads of 50,000 k. w., but the peak for one, due to the fact that it 1442
primarily serves industrial consumers, occurs during the morning and the peak of the other, due to the fact that it has primarily a lighting load, occurs during the evening, the interconnection makes possible a saving in required generating capacity having a relation to the difference between the sum of the separate peak loads of the two systems minus the simultaneous peak load of the two systems as interconnected. (2) Economy transactions result from a tie-in of different generating sources to the same load centers, so
that the more efficient generating units may be 1443
operated at a high capacity factor and less efficient units may be operated at a lower capacity factor or held as standby and reserve. A tie-in between a hydro-electric plant where the operating cost per unit of energy is low may be made with a steam plant where the operating cost per unit is greater. Such tie-in may result in additional benefits in that hydro-electric capacity may be utilized to the full during periods of high water, and supplemented

by calling upon the steam plant to meet the system
1444 needs, during periods of water shortage or while storage reservoirs are being replenished. (3) Emergency or reserve interconnections permit utility systems to reinforce service in outlying load centers, or to meet energy requirements in event of breakdowns or outages and during predetermined shut down periods for the reconditioning of equipment, with less installed generating capacity.

C. In the progress of the transmission art, lines have been built for the purpose of transmitting power from producing plants or stations to load
1445 centers which might or might not be located in the state in which the plants are located, and for exchanging power between different parts of the system or between different systems, likewise all located in the same or in different states. In both cases, proportionate relationships between the amount of energy generated by a company and the amount received by it through purchase or interchange, while significant, may not be of controlling importance in appraising the value of the energy so received by purchase or interchange. Such appraisal involves considerations of the capital or
1446 operating economies to be obtained by the purchase or interchange of energy in the particular case. As hereinabove noted, different types and varying degrees of economies are effected through purchase or interchange under different circumstances.

128. *Data as to National Production, Consumption and Interstate Movements*

A. In the early days of the electric utility industry practically no energy was transmitted across state lines. Data compiled by the Federal Power Commission show that in 1928, 10.7% of the total energy generated by certain major utility systems in the United States was transmitted across state lines; that in 1929, 11.8%, in 1931, 14.2%, and in 1933, 17.18%, of such total was transmitted across state lines. With respect to the movement of electric energy across state lines and international boundaries in 1929, the 1931 Federal Trade Commission Report (71st Cong., 3rd Sess., Senate Doc. 238) found (p. 2) that, of the 95,582,144,161 kilowatt-hours of electric energy generated in the United States, 14,505,190,623 kilowatt-hours moved out of states in which generated across state lines and international boundaries. For the same year, it was found that of the 80,966,731,882 kilowatt-hours consumed within the United States, 15,906,132,127 or 19.65%, came into the state where consumed from other states or across international boundaries. (See page 2) If the purpose be to ascertain "exports" and "imports" by states, duplications in the figures of "outward" and "inward movement" must be eliminated where energy moves out of a state and back into it, or moves from one state through another to the state of destination. The Report points out (page 32 *et seq.*) difficulties in computing such duplications in that, where an interstate transmission line is fed by different generating sources and tapped by different distribution systems along its route it is often impossible to ascertain accurately the source or destination of energy specifically identified as

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crossing a state line. The elimination of this element of duplication, as computed in the Report,
1450 gives an "export ratio" of 13.42% instead of 15.18%, and an "import ratio" of 17.57% instead of 19.65% (See page 4). As appears from the Report, the ratios of outward and inward movements, and of exports and imports vary widely as between different states. In some there are practically no outward movements or exports, or inward movements or imports, while in others the outward or export ratio approximated 70% of the generation in the state, and the inward or import ratio was in excess of 100% of consumption in the
1451 state, including in both cases energy transferred through the state.

C. The Report (p. 41) further analyzed the quantities sent across state lines and the number of crossings, by voltage classes for 1929, as follows:

		Crossings		*Kilowatt-hours moving (thousands)*	
	Voltage class	*Number*	*Per cent of Total*	*Quantities both ways*	*Per cent of Total*
1452	110,000 and over	71	7.51	7,288,401	45.71
	66,000 but under 110,000	123	13.00	4,480,590	28.10
	33,000 but under 66,000	190	20.09	2,675,672	16.78
	11,000 but under 33,000	209	22.09	1,277,610	8.02
	6,600 but under 11,000	76	8.03	58,614	.37
	Under 6,600	277	29.28	162,798	1.02
	Total	946	100.00	15,943,685	100.00

This table shows that the crossings at 33,000 volts and over constituted 40.6% of the total number of crossings and carried over 90% of the total energy transmitted across state lines. 1453

D. The table set forth in paragraph C analyzing the movement of electric energy across state lines and the number of state crossings includes, without distinction, (a) the movement of such energy across state boundaries on the transmission lines of the generating company, and (b) the movement of energy across state boundaries on the transmission lines of a company which purchases such energy at wholesale directly or indirectly from the generating company within the state of generation. 1454

E. While figures and kilowatt-hours are not given in these tables, it may be deduced therefrom and accepted as approximately accurate here, that 368 crossings out of the 946 listed are owned by the same company which is both the export and import company, that is to say, by the company which generates electric energy in one state to be distributed by it in the second state, and that 354 crossings are owned by companies which are subsidiaries or associates of the generating company, leaving 94 crossings which are for deliveries by one utility company to another unrelated and independent utility company, 37 crossings which are for deliveries by a utility to an unrelated, non-utility customer and 95 crossings where the exporting company is not an electric utility, 66 of the latter involving situations in which the company which owns the crossing is both the importer and the exporter. 1455

F. From a study made in 1928 by the National
1456 Electric Light Association (predecessor of the present Edison Electric Institute) the kilowatt hours crossing state boundaries can be classified into three broad divisions: Those by one company for distribution by itself, between common subsidiaries of the same holding companies, and crossings for sale at wholesale to or interchange with non-associated companies. In percentage of the total kilowatt hours (1) crossing state boundaries or (2) generated, the following approximate results were obtained:

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Type of Transaction	*Percent of Total Energy Crossing State Boundaries*	*Percent of Total Energy Generated*
1. By one company for distribution by itself.	54%	6%
2. Between common subsidiaries of the same holding companies.	31%	3.4%
3. Crossings for sale at wholesale or interchange (between non-associated companies).	15%	1.6%

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Data compiled by the National Electric Light Association for 1929 showed a net increase of 1.1% in the proportion of the total kilowatt hours crossing state lines for that year over 1928 and it may

be assumed that, when divided into the three broad classes, the proportions would remain about the same as in 1928. 1459

129. *State Regulation of Electric and Gas Utilities.*

The electric and gas public utility company subsidiaries of the defendant holding companies conduct their utility operations under franchises granted by the incorporated cities and towns, and counties, in which they operate.

Most of the states in which the electric and gas public utility subsidiaries of the holding company 1460
defendants operate have public utility commissions (sometimes called by different names) which exercise jurisdiction over such public utilities to the extent provided by the laws of the respective states. The other states either have no such commissions (such regulation as exists being exercised by municipalities), or have commissions which have jurisdiction which is either limited territorially, or is in some form supplemental to the jurisdiction of the governing bodies of cities or towns which have primary jurisdiction within their limits.

The scope of jurisdiction of the different state 1461
commissions varies widely, in some cases including, and in others excluding, rates and service, accounting, issuance and sale of securities, contracts with affiliates, holding company acquisition of utility stocks, merger consolidation and purchase of utility properties, and other matters. The court may take judicial notice of the statutes of such states regulating public utilities, and the issue or sale of their

securities. The court may likewise take judicial
1462 notice of official decisions and orders of public utilities commissions or similar state regulatory bodies which may be called to its attention by brief of either party, by particular reference to specific decisions or orders, as published in official or standard publications, such as "Public Utilities Reports, Annotated", for the purpose of indicating the nature and scope of regulatory practice by the state commissions under such regulatory statutes.

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ARTICLE XIX.

DESCRIPTION OF ELECTRIC OPERATIONS OF SUBSIDIARIES OF HOLDING DEFENDANTS.

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130. *Preliminary Statement.*

A. This article describes the physical operations of each subsidiary of the holding defendants which is engaged in business as an electric utility company.

B. These electric utility subsidiaries include companies engaged in all the kinds or classes of electric business which have been generally hereinbefore described. Some of these subsidiaries are engaged in the production, transmission and distribution of electric energy within the boundaries of a single state and neither transmit nor receive energy across state boundaries. Others conduct the major portion of their operations within the boundaries of a single state and receive or transmit across state boundaries only a small percentage of the total electric energy which they handle. Others either transmit or receive at wholesale across state boundaries substantial percentages of the energy, which they handle. Others themselves operate directly in two or more states and transmit energy, for distribution by themselves, across state boundaries. The operating companies are classified under their respective parent holding companies. The operations of each company are described separately and, so far as they form a part of an interconnected group, their group operations are consolidated. Where subsidiaries of different holding

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companies form parts of an interconnected group, their separate operations are described under their respective holding companies and their group operations are described once, with appropriate cross references.

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C. Exhibit 111 contains tables analyzing the electric operations of each electric utility subsidiary of the holding defendants and the aggregate operations of all such subsidiaries, with particular reference to the transmission or receipt of energy across state boundaries. Exhibit 112 is a table comparing the aggregate business of the subsidiaries of the holding defendants with the aggregate electric utility business transacted by all electric utility companies in the United States. Maps comparing the electric service areas of electric utility subsidiaries of the holding defendants with the areas served by electric utility subsidiaries of principal holding companies in the United States and showing the principal generating stations and transmission lines of electric utility subsidiaries of the holding defendants are contained in Exhibit 112A (Map Nos. 1 & 2).

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SUBSIDIARIES OF AMERICAN COMPANY

131. *Pacific Power & Light Company* (Oregon and Washington) and its subsidiary, *Inland Power & Light Company* (Oregon and Washington), *Northwestern Electric Company* (Oregon and Washington), *The Washington Water Power Company* (Washington and Idaho) and its subsidiary, *Chelan Electric Company* (Washington and Idaho).

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Maps of these companies are shown in Exhibit 113 (Map Nos. 1 & 2).

B. *History*

(1) Pacific Power & Light Company, organized in Maine as a subsidiary of American Company in 1910, originally consisted of isolated systems: the Yakima-Walla Walla system in southern Washington which was not interconnected with any of the properties in Oregon, two systems in northern Oregon near the Washington-Oregon 1472
boundary around Hood River and Pendleton respectively, which were not interconnected with each other, and three isolated systems in Oregon in and around Astoria, Bend and Enterprise respectively. The Pendleton, Oregon system was later interconnected with the Yakima-Walla Walla system in Washington, and, shortly before the acquisition of Northwestern Electric Company by American Company in 1925, the Hood River system in Oregon was extended into Washington and connected with the system of Northwestern Electric Company at Condit, Washington. The 1473
three minor systems in Oregon have always remained isolated. The subsequent territorial development of this company has been confined to an enlargement of its service areas in northern Oregon and southern Washington.

(2) Northwestern Electric Company, incorporated in Washington by outside interests in 1911, was acquired by American Company in 1925. Its

1474 center of operations was Portland, Oregon, where it had steam electric generating stations. It was interconnected with the system of the non-associate Portland General Electric Company which likewise served Portland and adjacent territory. However, one of its plants was located at Condit on the White Salmon River in southern Washington and it also served Vancouver, Washington and adjacent territory and owned transmission lines crossing the Washington-Oregon boundary. Its field of operations, since acquisition, has remained substantially the same, although its generating capacity has been
1475 increased.

(3) The Washington Water Power Company, incorporated in Washington in 1889 with its center of operations in and around Spokane, Washington, had extended its operations by 1928 over the larger part of eastern Washington and northern Idaho and had developed interconnections with the Yakima-Walla Walla system of Pacific Power & Light Company in Washington and, in Idaho near the Idaho-Montana boundary with the system of The Montana Power Company. Substantially all
1476 the common stock of The Washington Water Power Company was acquired by American Company in 1928. Its major generating plants (including those of its wholly owned subsidiary, Chelan Electric Company, a Washington corporation) are located in eastern Washington and northern Idaho and on Lake Chelan in central Washington.

(4) Inland Power & Light Company (an Oregon corporation) was organized as a subsidiary of American Company in 1923, and for several years

its function consisted largely of buying stocks of various small utilities in the Pacific northwest, most of the properties of which were subsequently transferred to Pacific Power & Light Company and The Washington Water Power Company. All of the stock of Inland Power & Light Company was transferred to Pacific Power & Light Company in 1930. In that year Inland Power & Light Company built a large plant at Ariel on the Lewis River in Washington, and Pacific Power & Light Company built a transmission line to connect the Ariel plant with the system of Northwestern Electric Company at Vancouver, which line is leased to the latter Company. 1477 1478

(5) In 1930 Pacific Power & Light Company built a transmission line in Washington between Condit and Yakima—thus effecting for the first time complete interconnection between the major systems of all the above-mentioned companies.

C. *Pacific Power & Light Company*

(1) As previously stated, this company operates an interconnected system in southern Washington and northern Oregon. The three isolated systems of the company in Oregon have no direct or indirect interstate connections. The main interconnected system includes generating facilities in both states. 1479

(2) Details as to the business and operations of the company are included in Table A of Exhibit 111. Generally, the distribution of its business and operations in the two states in 1934 was approximately as follows:

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	Washington-Oregon Interconnected System:		*Oregon Isolated Systems*
	Washington	*Oregon*	
Business			
Customers	31,800	19,800	*
Communities Served	70	43	*
Energy Sales—kwh			
To ultimate consumers	90,818,000	26,545,000	23,387,000
At wholesale for resale	43,200,000	1,720,000	152,000
Total sales	134,018,000	28,265,000	23,539,000

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Electric Revenues			
From ultimate consumers	$ 2,356,200	$ 943,900	$ 651,100
From wholesale sales	89,600	18,700	2,300
Total electric revenues	$ 2,445,800	$ 962,600	$ 653,400
Operation—kwh			
Generation	34,226,000	60,142,000	28,578,000
Purchases	116,256,000	.....	3,275,000
Transfers into state	34,441,000	12,535,000	.....
Transfers out of state	*(12,535,000)*	*(34,441,000)*	.....
Total available in state	172,388,000	38,236,000	31,853,000

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* Included with Oregon interconnected system.

(3) The sales of the main interconnected system hereinabove generally described, consist primarily 1483
of retail distribution to ultimate consumers in Washington and Oregon. For its retail requirements in Washington, the company depends largely upon substantial purchases of energy (mainly firm power) in Washington from the associate The Washington Water Power Company (almost all of which is generated by the latter in Washington) and upon imports from its own generating plants in Oregon. The wholesale sales in Washington consist entirely of the sale to the associate Northwestern Electric Company at Condit of surplus hydro-electric energy, in part from its own plants and in part 1484
purchased from and generated by the associate The Washington Water Power Company in Washington. The wholesale sales in Oregon, which are minor, consist entirely of sales to non-associate companies for distribution in Oregon. All the transfers between Washington and Oregon in the operation of the Pacific Power & Light Company's main system are over its own lines and for its account. The transfer from Oregon to Washington is principally at the crossing near Condit from the Hood River system in Oregon where generating capacity 1485
is seasonally in excess of Oregon requirements, and the transfer from Washington to Oregon is largely at the crossings between Walla Walla and Pendleton. The interconnected system in both states is so operated as a unit that energy generated and purchased in Washington and energy generated in Oregon is commingled in the system so that the point of origin in Washington or Oregon of any particular energy sold either at wholesale or at retail cannot be identified.

The business of the three isolated systems in
1486 Oregon is confined entirely to that state.

D. *Northwestern Electric Company*

(1) As previously stated, this Company operates an interconnected system in and around Portland, Oregon, and Vancouver and Camas, Washington, with generating facilities in both States. Details as fo the business and operations of the Company are included in Table A of Exhibit 111. Generally, the distribution of its business and operations in the two States in 1934 was approxi-
1487 mately as follows:

	Oregon	*Washington*
Business		
Customers	33,100	8,500
Communities Served	3	19
Energy Sales—kwh		
To ultimate consumers	112,290,000	138,138,000
At wholesale for resale	22,220,000	2,538,000
Total sales	134,510,000	140,676,000
1488 *Electric Revenues*		
From ultimate consumers	$ 2,312,200	$ 866,600
From wholesale sales	51,700	10,100
Total electric revenues	$ 2,363,900	$ 876,700
Operation—kwh		
Generation	2,372,000	100,320,000
Purchases	.....	222,961,000
Transfers into state	153,818,000	14,000
Transfers out of state	*(14,000)*	*(153,818,000)*
Total available in state	156,176,000	169,477,000

(2) The sales of the Company, hereinabove generally described, consist primarily of retail distribution to ultimate consumers in Washington and Oregon, this retail business being about equally divided between the two States. The wholesale sales consist almost entirely of sales in Oregon to the non-associate Portland General Electric Company. Although it has available generating capacity (together with capacity at the Ariel plant of the associate Inland Power & Light Company available under a firm power commitment) both in Washington and Oregon, respectively, to supply its respective retail requirements in the two States, the Company, due to the availability of surplus hydro-electric energy by purchase from Inland Power & Light Company and Pacific Power & Light Company, in 1934 and 1935 operated its Oregon steam electric stations on a stand-by basis and purchased in Washington the greater part of its total Oregon requirements. Almost all the energy coming into Oregon from Washington is brought into a central substation in Portland where it is commingled with energy generated at the steam stations in Portland (during such times as they are in operation) and is either distributed at retail or sold to the Portland General Electric Company at wholesale after leaving such substation. All the transfers between Washington and Oregon in the operation of the Company's system are over its own lines and for its account. In addition to the transfers shown in the above tabulation, the Company transferred 964,000 kwh of Washington energy through Oregon back into Washington between points on the Washington-Oregon boundary, this loop transfer resulting inadvertently from the parallel operation of several crossings.

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E. *Inland Power & Light Company*

1492 The Company's principal plant is the Ariel plant in Washington, which in 1934 generated approximately 178,000,000 kwh, all of which was sold to the associate Northwestern Electric Company at the plant for transmission to Vancouver, Washington, over the line built by the Pacific & Light Company and leased to the Northwestern Electric Company. The generation at this plant in 1935 was approximately the same amount, but late in that year it started to sell a portion of its output to a non-associate utility company which distributes
1493 solely in Washington. It also delivers energy in Washington to Northwestern Electric Company for distribution in and about Kalama, Washington, and Rainier, Oregon. In Oregon, the Company owns two small generating plants, one at Cove, operated by Pacific Power & Light Company in connection with its Bend system, and one at Wallowa Falls, the entire output of which is sold to the Pacific Power & Light Company for its isolated Enterprise system. The company distributes no energy to ultimate consumers.

1494 F. *The Washington Water Power Company (and Its Subsidiary, Chelan Electric Company)*

(1) As previously stated, this company operates an extensive interconnected system through the eastern half of Washington and northern Idaho, and has generating facilities in both States.

(2) Details as to business and operations of the company are included in Table A, Exhibit 111. Generally the distribution of its business and opera-

tions in the two States in 1934 was approximately as follows: 1495

	Washington-Idaho Interconnected System	
	Washington	*Idaho*
Business		
Customers	54,100	12,000
Communities served	74	23
Energy Sales—kwh		
To ultimate consumers	348,757,000	154,818,000
At wholesale for resale	131,138,000	4,665,000
Total sales	479,895,000	159,483,000
Electric Revenues		
From ultimate consumers	$ 4,672,100	$ 1,448,000
From wholesale sales	537,800	41,300
Total electric revenues	$ 5,209,900	$ 1,489,300
Operation—kwh		
Generation	724,145,000	24,897,000
Purchases	32,275,000	145,000
Transfers into state	9,890,000	165,200,000
Transfers out of state	(*165,200,000*)	(*9,890,000*)
Total available in State	602,110,000	180,352,000

1496

1497

(3) The sales of the Company in Washington consist primarily of retail distribution to ultimate consumers. But it also normally sells substantial amounts of both firm and surplus hydro-electric energy at wholesale for resale, the major part of which (approximately 72 per cent in 1934) is purchased by Pacific Power & Light Company as hereinabove described, and the rest by non-associates for dis-

tribution in Washington. The Company also sells
1498 at wholesale for resale in Idaho a small amount of energy to non-associates at the Washington-Idaho boundary (approximately 5,500,000 kwh, with revenues of $19,500, in 1934). The sales in Idaho, in volume approximately one-third those in Washington, likewise consist primarily of retail distribution to ultimate consumers. The company also regularly delivers to three small Idaho customers of The Montana Power Company their entire requirements, which energy is billed as a wholesale sale to the latter company. To these three customers the company either delivers its own sur-
1499 plus energy for the account of The Montana Power Company, or delivers energy furnished by The Montana Power Company for the account of the latter. At times, as hereinafter described, the two companies also interchange energy at the point of interconnection in Idaho. The company generates in Washington most of its total requirements, and regularly transmits energy into Idaho where its generating stations (for reasons of economy) were not operated at full capacity during 1934 and 1935. In addition to the transfers between Washington and Idaho shown in the above tabulation, 28,795,000
1500 kwh were transferred between points on the boundary from one state through the other and back into the original state, these transfers resulting from loop or zig-zag crossings of the boundary by certain transmission and distribution lines. All tranfers across the Idaho-Washington boundary in the operation of the company's system are over its lines and for its own account. The purchases in Washington were all from a non-associate and consisted of

energy generated by such non-associate in Washington. The small purchases in Idaho were from the associate, The Montana Power Company, and represented surplus energy generated in Montana. 1501

G. *Group Operation*

(1) The systems of Pacific Power & Light Company and its subsidiary Inland Power & Light Company, of The Washington Water Power Company and its subsidiary Chelan Electric Company, and of Northwestern Electric Company are interconnected by transmission lines except for the isolated systems of Pacific Power & Light Company and the isolated plants of Inland Power & Light Company in Oregon, above described. This interconnected system is entirely a hydro system except for two steam plants in Portland, Oregon, which are now, and for some years last past have been, used primarily as standby plants. 1502

(2) The additional interconnections in Portland, between the Northwestern Electric Company and the non-associate Portland General Electric Company, effected subsequent to the acquisition of the former by American Company in 1925, were developed, on the basis of a study of the situation made by Bond and Share engineers, in order to accomplish operating economies through more extensive use of hydro capacity and a more efficient use of the existing steam plants of the companies in Portland. 1503

(3) Subsequent to the acquisition by American Company of The Washington Water Power Com-

pany in 1928, the above-mentioned companies de-
1504 veloped additional interconnections with each other as hereinbefore described in order to make the most efficient use of available generating capacity. These interconnections make it possible to utilize a substantial amount of the hydro-electric capacity available at any point throughout the interconnected system in excess of the requirements of the immediate customers of the generating company, and which would otherwise be wasted, to the extent that a demand exists anywhere throughout the system. The major developments in the course of this program, based upon a study made by Bond
1505 and Share engineers, were the construction of the Ariel hydro-electric plant in Washington by Inland Power & Light Company, of a transmission line from the system of the Northwestern Electric Company around Vancouver to Ariel, built by Pacific Power & Light Company and leased to Northwestern Electric Company, and the construction of a transmission line from the Condit plant of the latter company to Yakima, Washington, by the Pacific Power & Light Company. This study by Bond and Share engineers contemplated an initial flow of energy from Ariel and the steam plants of North-
1506 western Electric Company in Portland to the system of The Washington Water Power Company, in sufficient volume to permit the postponement of construction of additional generating capacity by that company. However, because of unanticipated economic conditions, the flow of energy during the last few years has been the other way, surplus hydro-electric energy generated by The Washington Water Power Company and by the Pacific Power & Light Company being delivered to the North-

western Electric Company for resale in and around Vancouver, Washington, and Portland, Oregon. By purchase of surplus energy from these companies and from the Ariel plant, the Northwestern Electric Company has effected savings in operating costs in that it has been able to supply the Portland area with hydro-electric energy from Washington as against energy generated by steam in Portland. 1507

(4) Analyzing the operations of the main interconnected system in *Oregon* in 1935, irrespective of the division of operations between the constituent companies, of the approximate total of 257.6 million kwh handled in the state (generated in the state, 95.7 million kwh; purchased in the state from non-associates, none) approximately 161.8 million kwh or 62.8% was received and 45.8 million kwh or 17.8% was transmitted across the Oregon-Washington boundary. As compared with the approximate total of 292.2 million kwh handled by all the constituent companies in the group in Oregon in 1935, the main interconnected system handled 257.6 million kwh or 88.2 per cent and the isolated Oregon systems handled 34.6 million kwh or 11.8 per cent. 1508

(5) Analyzing operations of the main interconnected system in the group in *Washington* in 1935, irrespective of the division of operations between the constituent companies, of the approximate total of 1,270 million kwh handled in the state (generated in the state, 1,132 million kwh; purchased in the state, 52 million kwh, from non-assoeiates) approximately 403.9 million kwh or 31.8% was transmitted and approximately 85.9 million kwh or 6.8% was received across the Washington-Oregon and Washington-Idaho boundaries. 1509

(6) As hereinabove noted, The Washington
1510 Water Power Company distributes energy in Idaho, which for the most part it now imports from its system in Washington, and interconnects in Idaho with the system of its associate, The Montana Power Company (next hereinafter described), which also distributes in that state. Analyzing the operations in *Idaho,* irrespective of the division of operations between the two constituent companies, of the approximate total of 288.8 million kwh handled in the state (generated in the state, 37.8 million kwh) approximately 251 million kwh or 86.9 percent was received across and approximately 58.8 million kwh
1511 or 20.4 percent was transmitted across the Idaho-Washington and Idaho-Montana boundaries.

(7) Further details of the operations, by states, of the companies above described are set forth in table B of Exhibit 111.

132. *The Montana Power Company*

(Montana and Idaho)

A. Exhibit 113 (Map No. 3) is a map of the sys-
1512 tem of The Montana Power Company as of 1935.

This Company, a New Jersey corporation organized in 1912, was acquired by American Company in 1928. Its electric utility business consists primarily of the generation, transmission and distribution of energy within the State of Montana, the center of operations being in the Butte and Great Falls area, but its lines and services extend throughout the major portion of the State. Prior to the acquisition of the Company by

American Company, it built the Thompson Falls hydro-electric plant in northwestern Montana and 1513
a transmission line extending therefrom to a point in Idaho near the Idaho-Montana boundary (the portion of the line in Idaho was originally constructed and operated by a wholly owned subsidiary, the Idaho Transmission Company, the properties of which, since the inception of this case, have been acquired by The Montana Power Company), and there established an interconnection with its associate The Washington Water Power Company. This line was constructed primarily to serve mining customers in northern Idaho who 1514
built their own distribution lines. This line in Idaho and the Thompson Falls plant are interconnected with the main system of The Montana Power Company only by means of transmission lines of the non-associate Chicago, Milwaukee, St. Paul and Pacific Railroad Company, to which The Montana Power Company furnishes electric energy for use in railroad operations under a contract which gives it certain transmission rights in the lines.

B. Details as to the business and operations of the Company are included in Table A, Exhibit 111. 1515
Generally, the distribution of its business and operations in the two States in 1934 was approximately as follows:

1516

	Montana Interconnected Montana	Idaho System Idaho
Business		
Customers	68,000	70
Communities served	112	1
Energy Sales—kwh		
To ultimate consumers	691,376,000	17,452,000
At wholesale for resale	1,411,000	
Total sales	692,787,000	17,452,000
Electric Revenues		
1517 From ultimate consumers	$ 7,524,300	$ 112,000
From wholesale sales	17,500	
Total electric revenues	$ 7,541,800	$ 112,000
Operation—kwh		
Generation	837,960,000	.....
Purchases	5,071,000	115,000
Transfers into state	.....	18,907,000
Transfers out of state	(*18,907,000*)	.....
Total available in state	824,124,000	19,022,000

1518 C. The energy sales of the company, hereinabove described, consist primarily of retail distribution to ultimate consumers throughout Montana. It also distributes a relatively small amount of energy in Idaho. The sales at wholesale for resale are all to local distribution systems in Montana, except for a small amount of surplus energy (145,000 kwh in 1934 which produced revenue of $400) delivered in Idaho across the Montana-Idaho boundary to the associate, The Washington Water Power Company. The company has no generating facilities in Idaho and normally imports its requirements

over its own line from the Thompson Falls plant in northwestern Montana, transmitting, however, 1519
a small amount of energy from Montana to the village of Avery, Idaho, over the lines of the Chicago, Milwaukee, St. Paul and Pacific Railroad Company. Except for this small amount, all transfers across the Montana-Idaho boundary in the operation of the company's system were over its own lines and for its own account. As hereinbefore noted, some of the mining customers of the company in Idaho are served over the lines of its associate, The Washington Water Power Company. For short periods the company has purchased its entire requirements in Idaho from The Washington Water 1520
Power Company, which enables it, as during the 1935 drought, to send energy generated at its Thompson Falls plant and a limited amount of energy purchased from the Washington Water Power Company, to its main system in Montana. These purchases in 1935 were approximately 27 million kwh as compared with 115,000 kwh in 1934.

D. Analyzing operations of The Montana Power Company in *Montana* in 1935, of the approximate 1521
total of 1,284 million kwh handled in the state (generated 1,263 million kwh and purchased from nonassociates 2.2 million kwh in the state), approximately 18.7 million kwh or 1.5 percent was received and approximately 16.6 million kwh or 1.3 percent was transmitted across the Montana-Idaho boundary. Further details of such operations are contained in Table B of Exhibit 111. The operations in *Idaho* of the company and of The Washington Water Power Company are analyzed in section 131, *supra*.

133. *Minnesota Power & Light Company* (Minnesota)
Northern Power Company (Wisconsin)
Superior Water, Light and Power Company (Wisconsin)

1522

A. Exhibit 113 (map No. 4) is a map of the properties of the three companies of this group as of 1935. Each company is a direct subsidiary of American Company.

B. Prior to the acquisition of substantially all of the voting securities of the three companies by
1523 American Company in 1923-1925, the properties of the three constituted an interconnected system in northeastern Minnesota and in and around Superior in northwestern Wisconsin. The properties of Minnesota Power & Light Company, a Minnesota corporation, comprised generating, transmission and distribution facilities all located in Minnesota. The properties of Northern Power Company, a Wisconsin corporation, consisted of distribution facilities in and around Superior, Wisconsin, connected (at the Wisconsin-Minnesota boundary) with the
1524 distribution system of Minnesota Power & Light company in and around the city of Duluth, Minnesota. The electric properties of Superior Water, Light and Power Company, a Wisconsin corporation, consisted of a distribution system and standby generating station in Superior, connected to and virtually a part of the distribution system of Northern Power Company. Subsequently, the facilities of Minnesota Power & Light Company in Minnesota were considerably extended and in-

creased in capacity, but there has been virtually no change in the area served by the Northern and Superior Companies. At the present time, there are three interconnections across the Minnesota-Wisconsin boundary between the Minnesota Company and the Northern Company, two by means of 14,000 volt submarine cables and one by means of a 33,000 volt overhead line. 1525

C. The principal office and place of business of Minnesota Power & Light Company is in Duluth, Minnesota. Its principal sales of electric energy are at retail to ultimate consumers in Minnesota where it serves approximately 44,000 customers in and near 62 communities. In 1934 its business was distributed approximately as follows: Sales to ultimate consumers, 223,000,000 kwh, with revenues of $4,600,000; sales to other electric utilities doing business solely in Minnesota, 14,000,000 kwh, with revenues of $280,000; sales in Minnesota to a Wisconsin municipality which carries the energy into Wisconsin for resale, 30,000 kwh, with revenues of $1,400; sales at the Minnesota-Wisconsin state boundary to the associate Northern and Superior Companies, 35,000,000 kwh, with revenues of $418,000; generation in Minnesota, 320,000,000 kwh; purchases in Minnesota of energy generated in Minnesota, 2,000,000 kwh. 1526 1527

D. The office and principal place of business of Northern Power Company is in Superior, Wisconsin. Its sales of electric energy at retail are to power customers in and around the city of Superior, Wisconsin. It also transfers substantial amounts of

energy, purchased by the Superior Company from
1528 Minnesota Company, for a short distance from the Minnesota-Wisconsin boundary to points of delivery in Wisconsin to the Superior Company. In 1934 its business was approximately as follows: Sales to ultimate consumers, 20,000,000 kwh, with revenues of $306,000; transfers to the associate Superior Company 12,600,000 kwh with revenues therefrom $6,000. Northern Power Company has no generating facilities, and it purchased all of its requirements from the associate Minnesota Company at the Minnesota-Wisconsin boundary.

1529 E. The office and principal place of business of Superior Water, Light and Power Company is in Superior, Wisconsin. Its principal sales of electric energy are at retail to ultimate consumers in Wisconsin in and around the the city of Superior. In 1934 its business was approximately as follows: Customers served, 9,600; energy sales to ultimate consumers, 11,000,000 kwh, with revenues of $497,000; energy sales to a small distribution system in Wisconsin, 170,000 kwh, with revenues of $4,000. Virtually all of its energy requirements were pur-
1530 chased from the associate Minnesota Power & Light Company across the the Minnesota-Wisconsin boundary over the lines of the associate Northern Company. It purchased 12,600,000 kwh from Minnesota Power & Light Company and generated 24,000 kwh in its minor standby steam station. Of its purchases, 1,100,000 kwh was surplus hydroelectric energy for use in its water works pumping plants.

F. Considering the operation, irrespective of the division of operations between the three con-

stituent companies, of the group in each state:— of the approximate total of 408 million kwh handled in *Minnesota* in 1935, approximately 32.6 million kwh or 8 percent was transmitted from Minnesota across the Minnesota-Wisconsin boundary; and virtually all the energy handled in Wisconsin, approximately 32.6 million kwh in 1935, was received from Minnesota across the boundary. 1531

134. *Nebraska Power Company* (Nebraska)
Citizens Power & Light Company (Iowa)

A. Exhibit 113 (map no. 5) is a map of the properties in the group as of 1935. 1532

B. In 1917 when the Nebraska Power Company (a Maine corporation) was organized and substantially all of its voting securities acquired by American Company, the properties consisted of a generating plant and distribution facilities, located in Nebraska, and distribution facilities and a small standby generating plant, located in Iowa and operated by Citizens Power & Light Company (a New Jersey Corporation), a wholly owned subsidiary. The Iowa facilities were interconnected with the facilities in Nebraska. 1533

C. The original border interconnection between the companies across the Missouri River has been entirely reconstructed and replaced by a line of greater capacity (now at 13,000 volts). The Nebraska Company has developed a 66,000 volt transmission system serving a compact area around Omaha, which system has been interconnected at

a point south of Omaha near the Nebraska-Iowa
1534 boundary with the system of a non-associate which operates both in Nebraska and Iowa and which is also interconnected with the distribution system of the Citizens Company in Iowa.

D. The principal office and place of business of the Nebraska Power Company is in Omaha, Nebraska. Its principal sales of electric energy are at retail to ultimate consumers in and around Omaha and 37 adjacent communities, all in Nebraska. In 1934 such sales amounted to approxi-
1535 mately 271,000,000 kwh sold to approximately 67,500 customers from which it derived approximately $6,000,000 in revenues. At the interconnection point south of Omaha, it sold at wholesale for resale to a non-associate in 1934 approximately 19,000,000 kwh from which it derived $105,000 in revenues. Since this non-associate distributes energy in both states, it is impossible to determine to what extent energy supplied by the Nebraska Company may have been transmitted across the Iowa boundary before distribution to ultimate consumers. At its generating
1536 plant near the Nebraska-Iowa boundary, the Nebraska Power Company supplies all the power and energy requirements of the Citizens Power & Light Company, approximately 25,000,000 kwh in 1934, with revenues of $282,000 to Nebraska Company. Nebraska Company also delivered to Citizens Company in 1934 for redelivery by it in Iowa to the aforesaid non-associate, approximately 5,000,000 kwh with revenues therefrom to Nebraska Company of approximately $30,000.

E. Citizens Power & Light Company transfers on its own line across the Nebraska boundary and distributes at retail in and around Council Bluffs, Iowa all of its energy requirements which are so purchased by it from Nebraska Company. In 1934, the Citizens Company sold approximately 22,000,000 kwh to approximately 13,000 customers from which it derived revenues of approximately $814,000. The Citizens Company also transfers over this line, for the account of a non-associate, the energy purchased by the latter from Nebraska Company, for which service Citizens Company in 1934 received approximately $5,000. 1537

F. Considering the operation, irrespective of the division of operations between the two constituent companies, of the group in each state, of the approximate total of 355 million kilowatt hours handled in *Nebraska* in 1935, approximately 32 million kilowatt hours or 9.0% was transferred across the Nebraska-Iowa boundary and all the energy handled in *Iowa,* approximately 32 million kilowatt hours, was transferred across the boundary. 1538

135. *Kansas Gas and Electric Company* (Kansas) 1539

Exhibit 113 (map no. 6) is a map of the properties of this company as of 1935. In 1909, when Kansas Gas and Electric Company (a West Virginia corporation) was organized and its securities acquired by American Company, its properties consisted of electric generating plants, transmission and distribution facilities (as well as certain gas properties subsequently disposed of to non-asso-

ciates) located solely within the State of Kansas.
1540 Since its organization, the Company has acquired additional utility properties and has made substantial additions to its own generating, transmission and distribution facilities, all within the State of Kansas, except for certain lines extending into the State of Missouri for the distribution of electric energy to a few customers in that State. The Company has a transmission line extending to the Kansas-Oklahoma boundary which is used to provide emergency interchange connections with a non-associate electric utility company having properties in Oklahoma. It also has facilities for establishing
1541 emergency connections in Kansas with two other non-associate electric utility companies.

The principal office and place of business of Kansas Gas and Electric Company is in Wichita, Kansas. Its principal sales of electric energy are at retail to ultimate consumers in southeastern Kansas. In 1934 its sales in Kansas were approximately 197,000,000 kilowatt-hours to approximately 62,500 customers, residing in and near approximately 62 communities, from which it derived approximately $5,000,000 in revenues. At the Com-
1542 pany's transmission line interconnection near the Kansas-Oklahoma boundary it conducted an emergency exchange amounting to approximately 3,000 kwh each way, settlement therefor being made in kind. Sales of energy in 1934 to the few industrial customers served in Missouri, representing all its Missouri business, aggregated approximately 6,000,000 kilowatt-hours, from which the Company derived approximately $80,000 in revenues. Of the Company's approximate total of

203,000,000 kilowatt-hours sold in 1934, approximately 6,000,000 kilowatt-hours, or 3%, was transferred across the Kansas-Missouri boundary and approximately 3000 kilowatt-hours, or less than 2/1000ths of 1%, was sold across the Kansas-Oklahoma boundary. 1543

136. *Florida Power & Light Company* (Florida)

Exhibit 113 (map no. 7) is a map of the properties of this Company as of 1935. In 1925, when the Florida Power & Light Company (a Florida corporation) was organized and its securities were acquired by American Company, its properties consisted of electric generating plants, transmission and distribution facilities, manufactured gas plants and distribution systems, and miscellaneous ice properties, located solely within the State of Florida. Since its organization, the Company has acquired additional electric utility properties and has made substantial additions to its own generating, transmission and distribution facilities, all located solely within the State of Florida. 1544

The principal office and place of business of Florida Power & Light Company is in Miami, Florida. Its principal sales of electric energy are at retail to ultimate consumers in Florida. In 1934 its sales of electric energy at retail were approximately 167,000,000 kilowatt-hours, to approximately 94,000 ultimate consumers residing in and near 152 communities in Florida, from which it derived approximately $9,000,000 in revenues. The Company also sold in 1934 at wholesale approximately 75,000 kilowatt-hours to an isolated non-associate electric utility system not having transmission lines 1545

extending to or across a State boundary, the aggre-
1546 gate revenues derived therefrom having been approximately $4000.

In 1934 the Company generated all of its electric energy requirements at its own plants in the State of Florida except approximately 1,400,000 kilowatt-hours purchased from a non-associate company whose electric facilities are located solely within the State of Florida and which does not have a transmission line extending to or across a State boundary, and 3,300,000 kilowatt-hours purchased from Florida Power Corporation, a non-associate electric utility company, for resale by Florida
1547 Power & Light Company to its own customers in the communities of Live Oak and Lake City, which communities are not connected with the company's main transmission system. Florida Power Corporation operates generating stations within the State of Florida and also had a transmission line crossing the Georgia boundary. That Company's interconnection with Florida Power & Light Company was discontinued in 1935, and since such discontinuance the latter Company has not purchased energy from or had any interconnection with
1548 a system having either transmission lines or interconnections crossing state boundaries.

137. *Central Arizona Light and Power Company* (Arizona)

Exhibit (map no. 8) is a map of the properties of this Company as of 1935. In 1924, when substantially all of the voting securities of Central Arizona Light and Power Company (an Arizona corporation) were acquired by Ameri-

can Company, the electric properties of the Central Arizona Company consisted of generation and distribution facilities located solely in Arizona. Its principal office and place of business has been and is in Phoenix, Arizona. All of its sales of electric energy are at retail to ultimate consumers in and near Phoenix, Arizona, and six adjacent Arizona communities. In 1934 its sales of electric energy, to approximately 23,000 customers, amounted to approximately 69,000,000 kilowatt-hours from which it derived approximately $2,200,000 in revenue. Its electric operations have continued to be, and now are, confined entirely to the State of Arizona. 1549 1550

138. *Texas Electric Service Company* (Texas)

Exhibit 113 (Map No. 9) is a map of the properties of this Company as of 1935. In 1929 when Texas Electric Service Company (a Texas corporation) was organized and substantially all of its voting securities were acquired by American Company, its properties consisted of electric generating plants, transmission and distribution facilities located solely within the State of Texas, except that the Company distributed a small amount of electric energy in Piedras Negras, Mexico. The Piedras Negras distribution system was sold to non-associates in 1935, all service thereto having been discontinued shortly thereafter. Properties constituting the Company's system had been previously owned by companies which were subsidiaries of American Company. Since its organization the Company has made substantial additions to its generating, transmission and distribution facilities, all located solely within the State of Texas. 1551

1552 The principal office and place of business of Texas Electric Service Company is in Fort Worth, Texas. Its principal sales of electric energy are at retail to ultimate consumers in Texas. In 1934 its sales of electric energy at retail were approximately 257,000,000 kilowatt-hours to approximately 73,000 ultimate consumers residing in and near 62 communities in Texas, from which it derived approximately $6,300,000 in revenues. The Company also sold in 1934 at wholesale approximately 87,000,000 kilowatt-hours to Texas Power & Light Company, an associate electric utility company and to other non-associate electric utility companies for resale
1553 by such companies. None of the purchasing companies has transmission lines extending to or across state boundaries. The revenues from such sales at wholesale amounted to approximately $190,000. In 1934 the Company purchased in Texas, in addition to its own generation, approximately 64,000,000 kilowatt-hours from Texas Power & Light Company, an associate Company, and from other non-associate companies, none of which has transmission lines extending to or across state boundaries.

1554 139. *Texas Power & Light Company* (Texas)

Exhibit 113 (Map No. 9) is a map of properties of this Company as of 1935. In 1912, when Texas Power & Light Company (a Texas corporation) was organized and its securities were acquired by American Company, its properties consisted of electric generating plants, transmission and distribution facilities (as well as certain gas properties subsequently disposed of) located solely within the State of Texas. Since its organization, the Com-

pany has acquired additional electric utility properties and has made substantial additions to its own generating, transmission and distribution facilities, all located solely within the State of Texas. 1555

The principal office and place of business of Texas Power & Light Company is in Dallas, Texas. Its principal sales of electric energy are at retail to ultimate consumers in Texas. In 1934 its sales of electric energy at retail were approximately 309,000,000 kilowatt-hours to approximately 106,000 ultimate consumers residing in and near 282 communities in Texas, from which it derived approximately $8,700,000 in revenues. The Company also sold in 1934 at wholesale approximately 36,400,000 kilowatt-hours to other electric utility companies not having transmission lines extending to or across state boundaries and sold approximately 17,000,000 kilowatt-hours at wholesale to Southwestern Gas & Electric Company, a non-associate company which has generating stations in Texas, Louisiana and Arkansas, as well as transmission lines crossing the Texas-Louisiana and Texas-Arkansas boundaries, but all or substantially all of the energy so purchased by the Southwestern Company was distributed by it in Texas. During August, 1935, directional relays were installed at the Company's interconnections with Southwestern Gas & Electric Company and elsewhere in the latter company's system which prevent the passage from Texas to Louisiana or Arkansas of any of the energy delivered to Southwestern Gas & Electric Company by Texas Power & Light Company. Such directional relays also prevent the passage of electric 1556 1557

energy generated by Southwestern Gas & Electric
1558 Company in Arkansas or Louisiana into the transmission system of Texas Power & Light Company. As a result of the installation of these directional relays, it is made certain that all of the electric energy sold by Texas Power & Light Company to Southwestern Gas & Electric Company is resold by the latter Company in Texas.

In 1934, Texas Power & Light Company had a transmission line interconnection with another non-associate company which maintained a line crossing the Texas-Oklahoma boundary but this crossing was discontinued in August, 1935.

1559 In 1934 the Company purchased in Texas, in addition to its own generation, approximately 49 million kilowatt-hours from other electric utility companies. None of the companies from which such energy was purchased has a transmission line extending to or crossing a state boundary except the above-mentioned Southwestern Gas & Electric Company, from which approximately 3,300,000 kilowatt-hours were purchased, all or substantially all of which was a repurchase of energy originally sold to the Southwestern Company by Texas Power
1560 & Light Company.

140. *Texas Public Utilities Corporation* (Texas)

Exhibit 113 (Map No. 9) is a map on which is shown the location of the properties of this Company as of 1935. Texas Public Utilities Corporation (a Texas corporation) was organized in 1926, substantially all of its voting securities having been acquired by a subsidiary of American Company which subsidiary subsequently transferred to

American Company all of its assets, including the securities of Texas Public Utilities Corporation. 1561
The latter Company's original electric utility properties consisted of a standby electric generating station and an electric distribution system located solely within the State of Texas. Since the Company's organization no material addition to its electric utility properties has been made.

The principal office and place of business of Texas Public Utilities Corporation is in Dallas, Texas. All of its sales of electric energy are at retail to approximately 1400 ultimate consumers in one community in Texas. Except during emergency 1562
periods requiring the operation of its standby generating station, the Company purchases in Texas its entire requirements of electric energy for electric utility purposes from Texas Power & Light Company, an associate electric utility company. The aggregate sales of electric energy by the Company in 1934 were approximately 1,400,000 kilowatt-hours, and its electric operating revenues for that year were approximately $75,000.

141. *New Mexico Electric Service Company*
(New Mexico)

1563

Exhibit 113 (Map No. 9) is a map on which is shown the location of the properties of this company as of 1935. In 1930, when New Mexico Electric Service Company (a New Mexico corporation) was organized and its securities were acquired by American Company, its properties consisted of electric generating and distribution facilities. Since 1930, additions have been made to the electric facilities of the company, but its service area (solely within the State of New Mexico) has not been greatly enlarged.

The principal office and place of business of New
1564 Mexico Electric Service Company is in Hobbs, New Mexico. Its public utility service consists in the generation of electric energy and its distribution at retail to ultimate consumers in Hobbs, New Mexico, and one adjacent community. It has no interconnections with any other electric utility company. In 1934, its sales of electric energy, to approximately 530 customers, amounted to approximately 2,200,000 kilowatt-hours, from which it derived approximately $87,000 in revenues.

SUBSIDIARIES OF ELECTRIC COMPANY

1565

142. *Dallas Power & Light Company* (Texas)

Exhibit 113 (Map No. 10) is a map of the properties of this Company as of 1935. In 1919, when a majority of the outstanding common stock of Dallas Power & Light Company (a Texas corporation) was acquired by Bond and Share, which later transferred its holdings of the Dallas Company's common stock to Electric Company, the Dallas Company's properties consisted of an electric generating plant, and transmission and distribution facilities
1566 located solely within the State of Texas. Since 1919 the Company has made substantial additions to its generating, transmission and distribution facilities, all located solely within the State of Texas.

The principal office and place of business of Dallas Power & Light Company is in Dallas, Texas. All of its sales of electric energy are at retail to ultimate consumers in Dallas, Texas, and suburbs, and in Highland Park and University Park, Texas.

In 1934 its sales of electric energy at retail were approximately 198,000,000 kilowatt-hours, to approximately 69,000 ultimate consumers, from which it derived approximately $5,200,000 in revenues. With the exception of a small amount of electric energy interchanged with Texas Power & Light Company, a subsidiary of American Company, all of the Company's electric energy is delivered to ultimate consumers. 1567

The Company does not have any interconnections with any other electric utility companies, except with said Texas Power & Light Company which likewise operates solely in Texas. Such interconnection is at a point near Dallas, Texas, and is used solely for the interchange of energy between the two companies. The energy so interchanged varies in amount from year to year, deliveries having been 3,725,000 kilowatt-hours and receipts 3,687,000 kilowatt-hours in 1934. 1568

143. *Utah Power & Light Company* (Utah, Idaho and Wyoming) and its two Subsidiaries, *The Western Colorado Power Company* (Colorado) and *Bountiful Light and Power Company* (Utah); and *Idaho Power Company* (Idaho, Oregon and Nevada) 1569

A.

Maps of the systems of these companies are shown in Exhibit 113 (Map Nos. 11 and 12).

B. *History*

1570 (1) When Utah Power & Light Company (a Maine corporation) was organized and subsantially all of its voting securities were acquired by a predecessor of Electric Company in 1912, its properties consisted principally of (1) a system extending from southeastern Idaho through the Salt Lake valley to central Utah, (2) a separate system in eastern Idaho, and (3) several small isolated systems. The system extending from southeastern Idaho into Utah had been acquired from several prior owners and compised several overlapping
1571 systems, only partially interconected.

(2) Subsequently the Utah Company developed interconnections between its system in southeastern Idaho and the system of Idaho Power Company and also between its previously separate eastern Idaho system and the system of Idaho Power Company under arrangements with Idaho Power Company giving the Utah Company transmission rights between the two parts of its system. It enlarged its system in both Utah and Idaho, extended its transmission system into Wyoming, and constructed a separate line from its Utah system across the
1572 Utah-Idaho boundary for interconnection with the system of Idaho Power Company. At the present time, the system of Utah Power & Light Company in the three states operates as a fully interconnected unit with the exception of a small isolated system in Wyoming and two small isolated systems in Utah. Included in the system of the company in Utah are certain generating stations

and distribution systems leased from its traction subsidiary, Utah Light and Traction Company, under a 99-year lease. 1573

(3) When Idaho Power Company (a Maine corporation) was organized and substantially all of its voting securities were acquired by a predecessor of Power Securities Corporation in 1915, its properties consisted of separate systems in southern Idaho, in southwestern Idaho and eastern Oregon, and in southeastern Idaho. The company subsequently constructed a transmission line connecting its southwestern and southeastern Idaho properties, and also extended a transmission line into Nevada to serve a mining load in that state (the properties in Nevada were formerly owned by a wholly-owned subsidiary, Nevada Power Company, but have been acquired by Idaho Power Company since the inception of this suit). It also acquired an isolated system in and near Salmon, Idaho, the properties of which were formerly owned by a wholly-owned subsidiary, Salmon River Power & Light Company. Interconnections were made with the transmission system of Utah Power & Light Company as above described. Except for the Salmon system, all of the properties of Idaho Power Company are now operated as an interconnected unit although its transmission capacity is not such as to give complete flexibility in transferring power between the various parts of its system. 1574 1575

(4) The Western Colorado Power Company (a Colorado corporation), a wholly-owned subsidiary of Utah Power & Light Company, has since its organization operated electric generating, transmis-

sion and distribution facilities in southwestern
1576 Colorado. The Western Colorado Power Company has no direct or indirect connections across state boundaries. The Bountiful Light and Power Company, substantially all of the securities of which are owned by Utah Power & Light Company, has since its organization operated an electric distribution system in and near Bountiful, Utah, purchasing all of its requirements of electric energy from Utah Power & Light Company.

C. *Utah Power & Light Company*

1577 (1) The location of this company's properties in Utah, Idaho and Wyoming has been previously stated. Its isolated system in Wyoming and its isolated systems in Utah have no direct or indirect connections across state boundaries. The main interconnected system includes generating facilities in all three states.

(2) Details as to the business and operations of the Company are included in Table A of Exhibit 111. Generally the distribution of its business and operations in the three states in 1934 was
1578 approximately as follows:

	Main System			Isolated		
	Utah	*Idaho*	*Wyoming*	*Utah*	*Wyoming*	1579
ness						
stomers	84,000	10,900	1,600	*	*	
mmunities served	182	88	2	*	*	
ergy sales—kwh						
To ultimate consumers	382,292,000	26,623,000	1,396,000	593,000	1,224,000	
At wholesale for resale						
Within the state	6,774,000	719,000	—	—	—	
Across state boundaries	—	—	—	—	—	
Total energy sales	389,066,000	27,342,000	1,396,000	593,000	1,224,000	
ctric revenues						
From ultimate consumers	$ 7,499,000	$ 735,000	$ 74,000	$35,000	$66,000	1580
From wholesale sales						
Within the state	126,000	17,000	—	—	—	
Across state boundaries	—	—	—	—	—	
Total electric revenues	$ 7,625,000	$ 735,000	$ 74,000	$35,000	$66,000	
ration—kwh						
eneration	166,430,000	131,187,000	—	868,000	1,661,000	
urchases						
Within the state	3,950,000	12,945,000	—	—	—	
Across state boundaries	201,698,000	—	—	—	—	
ransfers into state	94,031,000	—	1,774,000	—	—	
ransfers out of state	(*1,774,000*)	(*94,031,000*)	—	—	—	1581
Total available for state	464,335,000	50,101,000	1,774,000	868,000	1,661,000	

* Included in main system.

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(3) Utah Power & Light Company's principal
1582 office and place of business is in Salt Lake City, Utah. Its sales of electric energy are primarily at retail to ultimate consumers in the three states. In Utah and in Idaho it sells relatively small amounts at wholesale for resale to small utility systems distributing solely in the states in which they purchase.

(4) The main system of Utah Power & Light Company at present depends for its energy requirements primarily upon its own hydro-electric and steam generation and upon purchase of both
1583 firm and surplus hydro-electric energy from the associate Idaho Power Company. The operation of its system in eastern Idaho is substantially in balance as between energy generation and energy requirements so that only minor equalizing flows of energy are involved between the eastern Idaho portion of its system and the southeastern Idaho portion of its system. Its southeastern Idaho generating facilities are used primarily for its requirements in Utah, with the result that substantially all of their energy is transferred by the company over its own lines to its main system in Utah.
1584 The Wyoming portion of its main system is normally supplied entirely from Utah. The company's purchases from the associate Idaho Power Company comprise a substantial amount of firm energy (approximately 153,000,000 kwh in 1934) and a smaller amount of surplus hydro electric energy (approximately 62,000,000 kwh in 1934). The major portion of its purchases from Idaho Power Company are transmitted directly from Idaho Power Company into Utah by a line not used for other purposes in Idaho. This trans-

mission line from Idaho extends into Utah to the Terminal Substation near Salt Lake City, which is 1585
the central control point of the Company's system in Utah to which most of its principal generating stations in Utah are connected and at which Utah and Idaho generated energy is commingled. At this Terminal Substation, voltage is transformed from 130,000 volts, the voltage of transmission from Idaho, to 44,000 volts, at which voltage a secondary transmission system extends over the greater part of the territory served in Utah. The 130,000-volt lines from Idaho are also connected to a smaller substation in northern Utah, similar to the Terminal Substation, to which are connected certain of 1586
the generating stations in northern Utah and from which extend 44,000-volt secondary transmission lines.

(5) The Company's steam generating stations in Utah for some years past have normally been utilized only during low water periods, as a result of the availability of substantial amounts of surplus hydro-electric energy from Idaho Power Company.

(6) All of the transfers between Idaho and 1587
Utah are over the Company's own lines and for its own account.

D. *Idaho Power Company*

(1) The location of this Company's properties in Idaho, Oregon and Nevada has been previously stated. The Company's isolated system at Salmon, Idaho, has no direct or indirect connections across

state boundaries. All of the company's generating
1588 stations are located in Idaho except for a minor hydro-electric station in Oregon.

(2) Details as to the business and operations of the Company are included in Table A of Exhibit 111. Generally the distribution of its business and operations in the three states in 1934 was approximately as follows:

	Main System			*Isolate*
	Idaho	*Oregon*	*Nevada*	*Idah*
Business				
Customers	40,900	2,000	1	5
1589 Communities served	64	7	1	
Energy sales—kwh				
To ultimate consumers	115,906,000	16,944,000	1,021,000	551,0
At wholesale for resale				
Within the state	21,738,000	—	—	
Across state boundaries	204,466,000	—	—	
Total energy sales	342,110,000	16,944,000	1,021,000	551,0
Electric revenues				
From ultimate consumers	$ 3,194,000	$ 317,000	$ 17,000	$29,0
From wholesale sales				
Within the state	68,000	—	—	—
1590 Across state boundaries	507,000	—	—	—
Total electric revenues	$ 3,769,000	$ 317,000	$ 17,000	$29,0
Operation—kwh				
Generation	398,754,000	5,000	—	700,0
Purchases				
Within the state	30,882,000	—	—	—
Across state boundaries	—	—	—	—
Transfers into state	—	21,265,000	1,073,000	—
Transfers out of state	(22,338,000)	—	—	—
Total available for state	407,298,000	21,270,000	1,073,000	700,0

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(3) As shown above, the sales of Idaho Power Company, measured in electric revenues, consist predominantly of the retail distribution of electric energy to ultimate consumers in Idaho, Oregon and Nevada, but, measured in kilowatt-hours, consist predominantly of sales at wholesale for resale. The major portion of its wholesale business consists of sales to the associate Utah Power & Light Company, as hereinbefore described. The company transmits for its own account over its own lines into Oregon and Nevada all of the energy required for its retail distribution in those states (except for a small amount, approximately 5,000 kwh in 1934, generated by a minor hydro-electric station in Oregon) and also transmits into Oregon and there sells certain energy to a non-associate company (approximately 2,800,000 kwh in 1934 from which it derived $26,000 in revenue). The company's generating stations are all hydro-electric, in several instances having substantial storage capacity. The one minor station in Oregon is used almost exclusively for the purpose of voltage regulation.

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E. *Group Operation*

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(1) The facilities of Idaho Power Company in Nevada consist merely in transmission and distribution facilities. In 1935 an approximate total of 1.4 million kwh, received across the Nevada-Idaho boundary, was handled in *Nevada*. Likewise, the generating stations of the Idaho Company in Oregon and of the Utah Company in Wyoming respectively are inadequate to meet the needs in the respective states. Analyzing operations in *Oregon* in 1935,

of the approximate total of 28.6 million kwh handled
1594 (generated in the state 19 thousand kwh, purchased from non-associates in the state, none), virtually 100 percent was received across the Oregon-Idaho boundary. Similarly, analyzing operations (exclusive of the isolated system in the state) in *Wyoming,* of the approximate total of 2 million kwh handled in 1935 (none generated or purchased in the state), 100 percent was received across the Wyoming-Utah boundary.

(2) The systems of both the Idaho Company and the Utah Company rely primarily upon hydro-
1595 electric plants which must be so operated as to conserve water for irrigation purposes. The interconnections between these two systems have made possible a larger utilization of hydro-electric capacity than if the two systems were operated separately, the Idaho Company having had for many years last past a varying surplus over and above its own retail load, which has been in part available to and absorbed by the Utah Company in the course of the historical development of the two companies. Likewise, these interconnections make it possible to
1596 achieve substantial economies in operating costs through synchronizing the operation of the run-of-the-river plants of the Idaho Company on the Snake River, where the actual capacity depends primarily upon the level and continuity of water flow, and the plants of the Utah Company on the Bear River which include large water storage facilities. Since 1926 the Utah Company has relied upon the generating capacity of the Idaho Company in preference to operating its own steam plants, purchasing more than one-third of its entire requirements from the

latter in 1934 and 1935, and conversely the Idaho Company has relied upon sales to Utah as an outlet for nearly half of its output. The Utah Company is, however, presently completing the construction of a new steam plant in Utah having a capacity of 18,750 kilowatts. 1597

(3) The contract between the Utah and Idaho companies in effect since 1926 provides for sale by the Idaho Company to the Utah Company of 18,000 kilowatts of firm power and of such surplus hydro-electric energy as Idaho Company may from time to time have available and Utah Company may desire to receive. It provides also for simultaneous deliveries and receipts by both companies at the several points of interconnection, thus in effect affording to each transmission privileges between interconnection points through the lines of the other. Since the inception of the contract, the purchases of such firm energy and of surplus hydro-electric energy have consistently been substantial. 1598

(4) The hydro-capacity of the two companies in Idaho has been developed not only with reference to their mutual needs within the state, but also to take care of a substantial part of the energy requirements of the Utah Company in Utah where the retail load is now almost twice as great as the combined retail load of the two companies in Idaho. The Utah Company has never developed self-sufficient generating capacity in Utah. Consequently, it regularly transmits large amounts of energy, both energy generated by it and purchased from the Idaho Company, from Idaho into Utah. All of this energy flows through a terminal substation at 1599

Salt Lake City, which is the central or control point
1600 of the company's system in Utah, or through a similar, but smaller substation in northern Utah. Most of the energy purchased from the Idaho Company is transmitted over a line which leads directly into the Utah substations without being tapped for distribution.

(5) The scope of this movement of energy from Idaho into Utah is indicated by an analysis of the operations of the constituent companies in the group, in the two states. Of the approximate total of 520.5 million kwh handled in *Utah* by the Utah
1601 Company in 1935 (generated in the state 266.3 million kwh, purchased from non-associates in the state 4.8 million kwh), approximately 249.4 million kwh or 47.9 percent was received across the Utah-Idaho boundary and approximately 2.1 million kwh or 0.41 percent was transmitted across the Utah-Idaho and Utah-Wyoming boundaries. Analyzing operations in *Idaho,* irrespective of the division of operations between the two companies in the state, of the approximate total of 528.4 million kwh handled in 1935 (generated in the state 499.5 million kwh, purchased from non-associates in the state 28.9
1602 million kwh), approximately 279.4 million kwh or 52.9 percent was transmitted across the Idaho-Utah, Idaho-Nevada and Idaho-Oregon boundaries and approximately 83 thousand kwh or 0.02 percent was received across the Idaho-Utah boundary.

(6) The energy handled by the isolated systems in the Idaho-Utah group was less than one-half of one percent of the energy handled by the interconnected system.

Stipulation of Facts

144. *Arkansas Power & Light Company* (Arkansas) 1603
Louisiana Power & Light Company (Louisiana)
Mississippi Power & Light Company (Mississippi)

A.

Exhibit 113 (Map No. 13) is a map of the properties of the above companies as of 1935.

B. *History*

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(1) Prior to the organization (in 1926 and 1927) of the Arkansas, Louisiana and Mississippi companies, which operate in Arkansas, Louisiana and Mississippi respectively, the original properties of the Arkansas Company consisted principally of separate systems around Pine Bluff and Little Rock, Arkansas; the original properties of the Louisiana Company comprised generally two separate systems one in the northeastern part of the state around Sterlington, and one in the south around the outskirts of New Orleans, and various small isolated situations, all in Louisiana; and the original properties of the Mississippi Company comprised two systems around Jackson and Greenville, respectively, and various small isolated systems, all in Mississippi. The Pine Bluff system and the two Mississippi systems were all connected with a plant at Sterlington in the northeast Louisiana system. The system in southern Louisiana adjacent to New Orleans was connected to and was essen- 1605

tially a part of the distribution system of the asso-
1606 ciate New Orleans Public Service Inc. which had been organized in 1922.

(2) Subsequently, the Arkansas Company interconnected and extended its major properties in the State and built a line to interconnect at the Arkansas-Louisiana boundary with a separate system which the Louisiana Company had built up in northwestern Louisiana. Meanwhile the Mississippi Company had extended its lines northward and southward. Finally, an interconnection between the Arkansas and Mississippi Companies,
1607 and an interconnection between each of them respectively and the Memphis Power & Light Company (a subsidiary of National Company) were effected through the southwestern corner of Tennessee, the portion of the line in Tennessee being owned by the Memphis Company. (See Exhibit 113 (Map No. 14) which is a map of the latter Company, showing these interconnections.) At about the same time, interconnection was effected between the southern portion of the Mississippi Company's system and certain properties in Louisiana just
1608 south of the Mississippi boundary acquired by the Louisiana Company, which properties were later tied in by emergency interconnections with the associate New Orleans Public Service Inc. and with the non-associate Baton Rouge Electric Co.

C. *Arkansas Power & Light Company*

As previously stated, this Company (an Arkansas corporation) operates an interconnected system covering a large part of central and southern

Arkansas. In addition to its main interconnected system, it has three isolated systems in Arkansas, two of which have no connections direct or indirect with any system outside of the State, and one of which is connected to a non-associate system which has connections with other systems which extend outside of Arkansas. 1609

Details as to the business and operations of the Company are included in Table A of Exhibit 111. Generally, the business and operations of the main system and the isolated systems in 1934 were approximately as follows:

	Main System	*Isolated Systems*
Business		
Customers	58,900	*
Communities served	223	*
Energy sales—kwh		
To ultimate consumers	216,389,000	2,406,000
At wholesale for resale		
Within the state	32,149,000	—
Across state boundaries	4,773,000	—
	—	—
Total energy sales	253,311,000	2,406,000
Electric revenues		
From ultimate consumers	$ 5,320,000	$ 137,000
From wholesale sales		
Within the state	358,000	—
Across state boundaries	99,000	—
Total electric revenues	$ 5,777,000	$ 137,000

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1612	*Operation—kwh*		
	Generation	95,992,000	87,000
	Purchases		
	Within the state	495,000	3,164,000
	Across state boundaries	218,918,000	—
	Total available in state	315,405,000	3,251,000

* Included in main system.

1613 (1) The sales of this Company consist predominantly of retail distribution to ultimate consumers in Arkansas.

(2) The wholesale business within the State is about equally divided between sales to companies which operate entirely in Arkansas and sales to companies which operate both within and outside of the State. All of the wholesale sales across state boundaries are of surplus hydro-electric energy to the associate Louisiana Power & Light Company, deliveries being made in part directly at the Arkansas-Louisiana boundary (approxi-
1614 mately 3,543,000 kwh in 1934) and in part indirectly to the Mississippi Power & Light Company for the Louisiana Company's account, these latter deliveries being made through Tennessee over the lines of the Memphis Power & Light Company (approximately 1,230,000 kwh in 1934).

(3) The Arkansas Company in 1934 and for several years past has generated in its own plants only the smaller portion of its requirements. With-

in the State of Arkansas it purchased certain small amounts from non-utility sources which were generated in the State. Its purchases across state boundaries were almost entirely of surplus energy from the associate Louisiana Power & Light Company, with a small amount from Memphis Power & Light Company. 1615

In addition to purchases and sales shown in the above tabulation, the Company regularly transmits over its lines substantial amounts of energy for the account of the Louisiana Company (in 1934, 72,586,000 kwh to the Mississippi boundary, 2,089,000 kwh to the Tennessee boundary for transfer by the Memphis Company to the Mississippi boundary, and 4,499,000 kwh back to the Louisiana boundary for redelivery to the Louisiana Company at its system in the northwest corner of Louisiana). 1616

(4) The sales of the Company's isolated systems consist entirely of retail distribution to ultimate consumers in Arkansas. These isolated systems generated only a minor part of their requirements, the major part being purchased from various sources, principally from a non-associate system which generates in the state and has interconnections with systems outside of the state. 1617

D. *Mississippi Power & Light Company*

(1) As previously stated, this Company (a Florida corporation) operates an interconnected system extending the whole length of the western portion of Mississippi, and has a number of isolated systems in Mississippi, which (with the exception

1618 of the "Northern" and "Natchez" systems) have no connections direct or indirect with systems outside of the State.

(2) Details as to business and operations of the Company are included in Table A of Exhibit 111. Generally the business and operations of the main system and the isolated systems in 1934 were approximately as follows:

		Main System	*Northern System*	*Natchez System*	*Other Isolated Systems*
	Business				
1619	Customers	38,300	*	*	*
	Communities served	190	*	*	*
	Energy sales—kwh				
	To ultimate consumers	109,257,000	674,000	3,889,000	903,000
	At wholesale for resale				
	Within the state	118,000	—	—	27,000
	Across state boundaries	—	—	149,000	—
	Total energy sales	109,375,000	674,000	4,038,000	930,000
	Electric Revenues				
	From ultimate consumers	$ 3,387,000	$31,000	$ 183,000	$42,000
1620	From wholesale sales				
	Within the state	3,000	—	—	$ 1,000
	Across state boundaries	—	—	$ 5,000	—
	Total electric revenues	$ 3,390,000	$31,000	$ 188,000	$43,000
	Operation—kwh				
	Generation	1,785,000	—	4,529,000	960,000
	Purchases				
	Within the state	—	—	—	482,000
	Across state boundaries	138,770,000	842,000	—	—
	Total available in State	140,555,000	842,000	4,529,000	1,442,000

* Included in main system.

(3) The sales of the main system of the company consist almost entirely of retail distribution to ultimate consumers in Mississippi. The company regularly purchases almost its entire requirements under a firm power contract from its associate Louisiana Power & Light Company, the energy so purchased being received either directly at the Mississippi-Louisiana boundary or indirectly at the Arkansas-Mississippi or Tennessee-Mississippi boundaries. 1621

(4) In addition to the transactions shown in the above tabulation, the Company regularly transmits over its lines in Mississippi minor amounts for the account of the Arkansas Company from the Arkansas-Mississippi boundary to the Mississippi-Tennessee boundary (18,858,000 kwh in 1934) and substantial amounts for the account of the Louisiana Company between points on the Mississippi-Louisiana boundary (48,627,000 kwh in 1934). 1622

(5) The sales of the Company from its isolated systems consist almost entirely of retail distribution to ultimate consumers in Mississippi, the principal exception having been a small sale by the Natchez system across the state boundary to a municipality in Louisiana, which sale has been discontinued since the latter part of 1935. The energy sources for the isolated systems consist of generation or purchase from sources within the state except in the case of the northern isolated system which purchases its entire requirements from Memphis Power & Light Company over distribution lines crossing the Tennessee-Mississippi boundary. 1623

E. *Louisiana Power & Light Company*

1624 (1) As previously stated, this Company (a Florida corporation) operates an interconnected system extending over considerable parts of northern, central and southern Louisiana. A portion of this system in northwestern Louisiana is connected with the main system only through the lines of the associate Arkansas Power & Light Company, and the southern part of its system is connected with the main northeastern part of the system only through the lines of the associate
1625 Mississippi Power & Light Company. The Company also has several small isolated systems in Louisiana.

(2) Details as to the business and Operations of the Company are included in Table A of Exhibit 111. Generally, the business and operations of the main system and the isolated systems in 1934 were approximately as follows:

	Main System	*Isolated Systems*
Business		
1626 Customers	26,900	*
Communities served	134	*
Energy sales—kwh		
To ultimate consumers	182,244,000	1,024,000
At wholesale for resale		
Within the state	6,359,000	—
Across state boundaries	357,545,000	—
Total energy sales	546,148,000	1,024,000

Electric revenues			
From ultimate consumers	$ 2,884,000	$ 50,000	1627
From wholesale sales			
Within the state	78,000	—	
Across state boundaries	1,500,000	—	
Total electric revenues	$ 4,462,000	$ 50,000	
Operation—kwh			
Generation	519,926,000	691,000	
Purchases			
Within the state	58,710,000	504,000	1628
Across state boundaries	4,773,000	—	
Total available in state	583,409,000	1,195,000	

* Included in main system.

(3) The greater portion of the revenues of this Company are derived from retail distribution to ultimate consumers in Louisiana, but in kilowatt-hour volume the greater part of its business consists of sales at wholesale for resale. 1629

(4) The relatively minor wholesale sales within the state are to local distribution systems which sell entirely in Louisiana. The wholesale sales across state boundaries are to its associates, in 1934, 218,775,000 kwh to the Arkansas Company, and 138,770,000 kwh to the Mississippi Company, deliveries to the Arkansas Company being made di-

rectly at the Louisiana-Arkansas boundary, and
1630 to the Mississippi Company directly at the Louisiana-Mississippi or indirectly at the Arkansas-Mississippi or Tennessee-Mississippi boundaries.

(5) The Company generates at Sterlington by far the greater part of its total requirements. It regularly purchases a substantial amount of energy (approximately 52,877,000 kwh in 1934), all as firm power, from the associate New Orleans Public Service Inc. for its local distribution system in the vicinity of New Orleans. In addition, it from time to time purchases emergency energy (5,828,000
1631 kwh in 1934) from that company for its main interconnected system. It regularly purchases surplus hydro-electric energy, when available, from the Arkansas Company (approximately 4,773,000 kwh in 1934).

(6) In addition to the transactions shown in the above tabulation, in 1934, the Company transmitted through Louisiana between points on the Louisiana-Arkansas boundary for the account of the Arkansas Company 1,153,000 kwh (practically
1632 all of this being an inadvertent flow through Louisiana due to parallel operation), and it also transmitted for the Mississippi Company between points on the Louisiana-Mississippi boundary through Louisiana 193,000 kwh.

F. *Group Operation*

(1) Although the Arkansas, Mississippi and Louisiana Companies have generating plants, transmission lines and distribution systems in the re-

spective states in which they operate, their main systems are operated essentially as a coordinated unit from the point of view of the generation of electricity. Shortly after Electric Company acquired controlling interest in these companies, the advantages of expanding the Sterlington plant as the major generating center of the interconnected systems over the immediate future became evident. The Sterlington plant is fired with natural gas which it obtains at low cost from a field apparently having a long life. The capacity of Sterlington was increased from 25,000 to 85,000 kilowatts; many small and relatively inefficient steam plants in Louisiana, Arkansas and Mississippi were abandoned, and a few retained merely for emergency standby, local area protection or for voltage stablization to improve the efficiency of the entire system; and a second major hydro-electric plant in Arkansas with a rated installed capacity of 56,000 kilowatts was completed. In addition to these hydro-electric plants, the only stations outside of Sterlington now suitable for carrying substantial loads are the Pine Bluff and Little Rock Steam plants in Arkansas with a rated installed capacity of 27,000 kilowatts.

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(2) Sterlington, operated at a high capacity factor, supplies the major part of the requirements of the Louisiana Company, almost the entire normal requirement of the Mississippi Company, and a substantial portion of the requirements of the Arkansas Company. Although the rated installed generating capacity of the latter would ordinarily be sufficient to meet its maximum load requirements, the ca-

pacity actually available in Arkansas, due to sea-
1636 sonal water flow conditions at its hydro-electric plants, would not be adequate in dry years. Furthermore, receipt of energy from Sterlington enables the Arkansas Company to "firm" its hydro-electric capacity by maintaining the level of its water storage reservoirs. The interconnection between the companies is used to their mutual advantage in that Louisiana agrees to buy in so far as practicable all surplus hydro energy of Arkansas; Arkansas agrees to buy from Louisiana in preference to other sources all energy it may re-
1637 quire beyond that generated at its hydro-electric plants (and such steam energy as may be generated for local area protection and voltage stabilization) and to maintain the level of its storage reservoirs so as to be in a position to supply Louisiana during emergencies. Likewise, the Mississippi Company agrees to maintain certain steam standby capacity so as to have it available for Louisiana during emergencies. In addition, both the Arkansas and Mississippi Companies respectively, under contract with the Louisiana Company, agree to receive and deliver to and from each other energy originally
1638 supplied by the Louisiana Company for the account of the latter Company.

(3) The large export from Louisiana of energy generated at Sterlington in the normal operation of the main group system, is reflected in the 1935 figures. Separate figures are shown for the two other parts of the system of the Louisiana Company in Louisiana, the one in northwestern and the one in southeastern Louisiana. The former exclusively,

and the latter in part, handle energy generated at Sterlington and transmitted, through Arkansas 1639
by the Arkansas Company and through Mississippi by the Mississippi Company, respectively, for the account of the Louisiana Company. The system of the New Orleans Public Service Inc. (hereinafter described, section 145) normally operates as a self-sufficient unit. It makes regular sales to the otherwise isolated local distribution system of the Louisiana Company adjacent to New Orleans, and at times during emergencies it delivers certain amounts of energy to the main transmission system of the Louisiana Company. 1640

(4) *Louisiana*: (1) Of the approximate total of 491.4 million kwh handled by the northeastern Louisiana system (generated at Sterlington 472.7 million kwh, purchased from non-associates in the state none), approximately 351.2 million kwh or 71.5 percent was transmitted and approximately 18.7 million kwh or 3.8 percent was received across the Louisiana-Arkansas and Louisiana-Mississippi boundaries; (2) All the energy handled by the northwestern system, approximately 4.7 million kwh, was received across the Louisiana-Arkansas 1641
boundary; and (3) Of the approximate total of 387.3 million kwh handled, irrespective of the division of operations between the two companies, by southeastern system of the Louisiana Company and by New Orleans Public Service Inc. (generated in the state 339.5 million kwh; purchased from non-associates in the state none), approximately 47.7 million kwh or 12.3 percent was received and 1.9 million kwh or 0.5 percent was transmitted across the Mississippi-Louisiana boundary.

(5) *Mississippi*: Of the approximate total of
1642 218.2 million kwh handled by the main system of the Mississippi Company (generated 2.6 million kwh in the state, purchased from non-associates in the state none), approximately 215.6 million kwh or 98.8% was received and approximately 61.1 million kwh or 28.0 percent was transmitted, across the Mississippi-Louisiana, Mississippi-Arkansas and Mississippi-Tennessee boundaries. The company has two other minor systems in Mississippi which have boundary connections, one south of Memphis which received all of its energy from Tennessee, (approximately 889 thousand kwh) and the
1643 other near Natchez which handled approximately 4.9 million and exported (late in 1935 use of the boundary interconnection was discontinued) less than 2 per cent thereof into Louisiana.

(6) *Arkansas*: Of the approximate total of 456.4 million kwh handled by the main system of the Arkansas Company in Arkansas (generated in the state 191.6 million kwh, purchased from non-associates in the state 889 thousand kwh), approximately 263.9 million kwh or 57.8 percent was re-
1644 ceived and approximately 136.1 million kwh or 29.8 percent was transmitted across the Tennessee-Arkansas, Arkansas-Mississippi and Arkansas-Louisiana boundaries.

(7) The isolated systems of the Arkansas, Louisiana and Mississippi companies are confined in their operation to Arkansas, Louisiana and Mississippi respectively, and handled in the aggregate (with the exception of the Northern and

Natchez systems of the latter) 6.5 million kwh in 1935. 1645

(8) Interconnections between the Memphis Power & Light Company (a National Company subsidiary hereinafter described) and the Arkansas Company at the Tennessee-Arkansas boundary and with the Mississippi Company at the Tennessee-Mississippi boundary, respectively, were effected, in part to reinforce service in northern Arkansas and Mississippi, and in part for mutual system capacity reserve, the need for which was particularly evident in the case of the Memphis Company. In addition to these boundary transmission crossings, there are three distribution crossings across the Tennessee-Mississippi boundary over which the Memphis company supplies all the requirements of the isolated Northern system of the Mississippi Company. 1646

(9) Originally a contract was entered into between the Memphis and Arkansas Companies whereby the former agreed to pay an annual charge for 7500 kva of standby capacity. Shortly thereafter a second interconnection between the two companies was constructed and the contract was modified to provide for the purchase by the Memphis Company of 18,000 kva of standby capacity for a limited period. Later, on recommendation of Bond and Share, the Companies agreed on a further modification, now in effect until cancelled upon 60 days notice by either party, under which Arkansas agrees to make available 10,000 kva firm capacity and in addition any excess it may have available during shortages or emergencies at Memphis and the Memphis Company agrees to pay a fee 1647

therefor. Likewise, the Arkansas Company agrees
1648 to supply surplus power to the Memphis Company.

(10) As hereinafter described, the Memphis Company is interconnected in Tennessee with and supplies a major portion of the normal requirements of its associate West Tennessee Power & Light Company (a National Company subsidiary hereinafter described), which operates exclusively in Tennessee. Considering operations of the interconnected system of these two companies in *Tennessee* in 1935, irrespective of the division of operations between the companies, of the approximate
1649 total of 225.1 million kwh handled in the state (generated in the state 203.8 million kwh, purchased in the state none), approximately 21.3 million kwh or 9.5 percent was received and approximately 22.4 million kwh or 9.9 percent was transmitted across the Tennessee-Arkansas and Tennessee-Mississippi boundaries.

(11) Further details of the group operations of the companies described in this section are set forth in Table B of Exhibit 111.

1650 145. *New Orleans Public Service Inc.* (Louisiana)

(1) Exhibit 113 (map no. 13), which is a map of the properties of the associate Arkansas, Louisiana and Mississippi Companies, described in section 144, indicates the location of the properties of the New Orleans Company with relation to those of such associate companies. In 1923 when Bond and Share acquired control of a majority of the voting securities of the predecessor in interest of New Orleans Public Service Inc. (later transferred to Electric Company) the properties of the New Orleans Com-

pany consisted of an electric generating plant and distribution system, all located in New Orleans, Louisiana. Since 1923, substantial additions have been made to the electric generating and distribution facilities, but the company's service area has not changed materially since 1923. The Company's principal office and place of business is in New Orleans, Louisiana. Its principal sales of electric energy are at retail to ultimate consumers in and near New Orleans, Louisiana. It also sells electric energy at wholesale to a distribution system of the associate Louisiana Power & Light Company which is located adjacent to New Orleans and from time to time, in emergencies sells a small amount of energy at wholesale (for resale) to the Louisiana Company's main interconnected system. 1651 1652

(2) In 1934 the Company's electric business and operations were approximately as follows:

Customers served	87,000
Electric energy sales—kwh	
To ultimate consumers	215,412,000
At wholesale for local distribution	52,877,000
At wholesale during emergencies	5,828,000
Total electric energy sales	274,117,000
Electric operating revenues	
From ultimate consumers	$ 7,022,000
From wholesale sales	470,000
Total	**$ 7,492,000**
Electric energy generation—kwh	307,693,000

1653

(3) All of the electric energy sold by the Com-
1654 pany is generated at its station in New Orleans. Its distribution system in New Orleans is connected with a distribution system of the associate Louisiana Power & Light Company adjacent to and near New Orleans, and energy is sold to the Louisiana Company at wholesale for resale at points on the Louisiana Company's distribution feeders. All of the energy so sold to the Louisiana Company is distributed locally in Louisiana.

(4) The Company's generating station is con-
1655 nected through a line owned by the Louisana Company to the Louisiana Company's main interconnected transmission system, and the emergency energy sold by the New Orleans Company (a Lousiana corporation) is sold at the Company's generating station over this interconnection. The emergency energy so sold does not commingle with the energy sold to the Louisiana Company's local distribution system.

SUBSIDIARIES OF NATIONAL COMPANY

146. *Memphis Power & Light Company*
1656 (Tennessee)

West Tennessee Power & Light Company
(Tennessee)

A. Exhibit 113 (Map No. 14) is a map of the systems of these two companies.

B. In 1922 when Memphis Power & Light Company (a New Jersey corporation) was organized

and its securities acquired by National Company, its electric properties consisted of generating and distribution facilities located wholly in Tennessee and serving the city of Memphis and adjoining territory. 1657

In 1928 when West Tennessee Company (a Florida corporation) was organized and its securities acquired by National Company, its electric properties consisted of generating and distribution facilities located wholly in Tennessee and serving Jackson and certain other towns in west Tennessee and of a transmission line interconnecting its system with that of the Memphis Company. 1658

Subsequently to 1922, the Memphis Company extended its lines to the Mississippi boundary and to the Arkansas boundary to interconnect at said boundaries with the respective lines of Mississippi Power & Light Company and Arkansas Power & Light Company (subsidiaries of Electric Company).

The Memphis Company also extended its distribution lines at three places to the Mississippi boundary to meet distribution lines of the Mississippi Company which serve three otherwise isolated minor systems in northern Mississippi. 1659

The business and operations of the two companies, details of which are included in Table A, Exhibit 111, were approximately as follows in 1934:

	Memphis Power & Light Co	*West Tenn Power & Light Co*
Business		
Customers	51,400	9,000
Communities served	6	19

	Energy sales—kwh		
1660	To ultimate consumers	150,484,000	13,195,000
	At wholesale for resale		
	Within the state	11,038,000	390,000
	Across state boundaries	985,000	—
	Total energy sales	162,507,000	13,585,000
	Electric revenues		
	From ultimate consumers	$ 3,925,000	520,000
	From wholesale sales		
	Within the state	226,000	8,000
1661	Across state boundaries	15,000	—
	Total electric revenues	$ 4,166,000	528,000
	Operation—kwh		
	Generation	189,443,000	5,984,000
	Purchases		
	Within the state	1,000	11,038,000
	Across state boundaries	—	—
1662	Total available in state	189,444,000	17,022,000

The office and principal place of business of Memphis Power & Light Company is in Memphis, Tennessee. Its sales of electric energy are principally at retail to ultimate consumers in Tennessee. Its sales at wholesale for resale within the state, partly firm and partly non-firm energy, are exclusively to the associate West Tennessee Power &

Light Company. Its sales at wholesale for resale across state boundaries are to Arkansas Power & Light Company and Mississippi Power & Light Company, subsidiaries of Electric Company, which sales have been described above in connection with those two companies. The partial reliance by the Memphis Company upon the Arkansas Company for reserve generating capacity has also been hereinabove described. 1663

The principal office and place of business of West Tennessee Power & Light Company is at Jackson, Tennessee. Its sales of electric energy are primarily at retail to ultimate consumers in Tennessee. Its sales at wholesale for resale are to local distribution systems for use entirely in Tennessee. It purchases a small amount of firm energy and a considerable amount of surplus energy from the associate Memphis Power & Light Company. 1664

147. *Houston Lighting & Power Company*
(Texas)

Exhibit 113 (Map No. 15) is a map of the properties of this Company as of 1935. In 1922, when substantially all of the voting securities of Houston Lighting & Power Company (a Texas corporation) were acquired by National Company, the properties of the Houston Company consisted of electric generating, transmission and distribution facilities located solely within the State of Texas. Since 1922, the Company has acquired additional utility properties and has made substantial additions to its generating, transmission and distribution facilities, all located solely within the State of Texas. 1665

The principal office and place of business of
1666 Houston Lighting & Power Company is in Houston, Texas. Its principal sales of electric energy are at retail to ultimate consumers in Houston, Galveston and approximately 80 other adjacent communities in Texas. It also makes certain sales at wholesale to electric utility companies serving small isolated communities, which companies do not have any interconnected transmission lines extending to or crossing a state boundary. In 1934 the Houston Company's sales of electric energy to its approximately 104,000 ultimate customers amounted to approximately 411,000,000 kilo-
1667 watt-hours from which it derived approximately $8,000,000 in revenues. Its sales to said small electric utility companies for resale aggregated approximately 8,000,000 kilowatt-hours from which the Houston Company derived approximately $100,000 in revenues.

Prior to August, 1935, the Company also maintained an interconnection near Peters, Texas, with Texas Power & Light Company for the purpose of making certain sales of electric energy for local use during emergencies, as well as an interconnec-
1668 tion near Huffman, Texas, with Gulf States Utilities Company for the stabilization of transmission line voltage. The latter company maintains and operates generating stations in Texas and transmission lines which extend to and cross the Texas-Louisiana boundary, but the minor interchange involved in line stabilization probably could not have involved any commingling with energy crossing the Louisiana boundary. These interconnections with Texas Power & Light Company and Gulf States Utilities Company were discontinued in 1935.

With the exception of certain dump power purchased from non-utility companies in Texas, all the 1669
electric energy sold by the Company is generated at the Company's own generating plants. The amount of electric energy purchased from such non-utility companies (all solely within the State of Texas) varies from year to year, amounting to approximately 17,000,000 kilowatt-hours in 1934.

148. *Birmingham Electric Company* (Alabama)

Exhibit 113 (Map No. 16) is a map of the properties of this Company as of 1935. In 1924, when 1670
Birmingham Electric Company (an Alabama corporation) was organized and substantially all of its voting securities were acquired by National Company, the properties of the Birmingham Company consisted of an electric generating station (used for standby purposes only), gas manufacturing facilities, electric and gas distribution systems and a transportation system located solely within the State of Alabama. Since 1924 substantial additions have been made to the electric utility and transportation facilities of the Company, and its gas properties have been disposed of to non-associates. 1671

The principal office and place of business of Birmingham Electric Company is in Birmingham, Alabama. All of its sales of electric energy are at retail to ultimate consumers in Birmingham, Alabama, and eight adjacent communities. In 1934 its sales of electric energy to approximately 59,000 customers amounted to approximately 188,000,000 kilowatt-hours from which it derived approximately $4,000,000 in revenues.

The Company purchases its entire requirements
1672 of electric energy from Alabama Power Company at interconnections with that company near the City of Birmingham. Alabama Power Company is a non-associate electric utility company, having electric generating stations in the State of Alabama, as well as interconnections with companies having generating facilities outside the State of Alabama. It normally generates more electric energy at its stations in Alabama than is required to serve its Alabama customers, including Birmingham Electric Company, and normally exports energy to other
1673 states. When it imports energy into Alabama, the load between Birmingham and the Alabama state line has to date exceeded the energy imported, and there is no present indication of a change in this relation.

149. *Carolina Power & Light Company* (North Carolina and South Carolina)
Tennessee Public Service Company (Tennessee)
Roanoke River Power Company (Virginia)
Holston River Electric Company (Tennessee).
1674

A.

Exhibit 113 (Map No. 17) is a map of the properties of the above companies as of 1935.

B. *History*

(1) In 1908 when the predecessor company of the present Carolina Power & Light Company (a North Carolina corporation) was organized, its properties were located in and around Raleigh,

North Carolina. Subsequently, the company extended its system into northeastern South Carolina 1675
where it developed connections with two non-associates, Duke Power Company (at its Wateree generating station) which operates in North and South Carolina, and Lexington Water Power Company (at its Saluda generating station) which operates in South Carolina, for the purpose of purchasing power from these companies. The company extended its system in North Carolina approximately to the North Carolina-Virginia boundary and later developed an interconnection at the boundary, near Danville, with Appalachian Electric Power Company (a subsidiary of American Gas, which operates in Virginia, West Virginia and Tennessee) 1676
as well as a connection in North Carolina with the non-associate Virginia Electric & Power Company, which operates in North Carolina and Virginia. Another interconnection with the latter Company was developed in North Carolina through a transmission line loop extending for a short distance through Virginia but not interconnecting with other systems in Virginia. This transmission loop in Virginia is owned by the associate Roanoke River Power Company, organized in 1928. This 1677
system of the Carolina Power & Light Company in North and South Carolina is hereinafter referred to as the "Eastern Division". About 1912, a predecessor Company began to build up a separate system around Ashville, North Carolina which is hereinafter referred to as the "Western Division".

(2) At the time of their respective organizations in 1924 and 1925, the original properties of Holston River Electric Company and Tennessee Public Service Company, located entirely in Tennesssee, were interconnected with each other. At

that time, the latter Company was interconnected
1678 with the system of the non-associate Tennessee Electric Power Company, which was interconnected with its associates in Georgia and Alabama.

(3) Contemporaneously with the construction (1927-1930) of the Waterville plant in the Western Division of the Carolina Power & Light Company, that company built a transmission line to Greenville, South Carolina, to interconnect with the system of the non-associate Duke Power Company, and the Tennessee Public Service Company built
1679 a transmission line in Tennessee connecting with the Carolina Company's Waterville generating station at the North Carolina-Tennessee boundary and with the above mentioned Appalachian Electric Power Company's system at Kingsport, Tennessee. This line in Tennessee was interconnected with the system of the Tennessee Public Service Company at a point near Newport, and shortly thereafter an additional direct line was built to interconnect the Knoxville territory with the Waterville plant at the North Carolina-Tennessee boundary. Thus, at the present time, the Eastern and Western Divi-
1680 sions of the Carolina Power & Light Company are interconnected by a two-way tie-in, in the north through the lines of the Appalachian Electric Power Company and the Tennessee Public Service Company, and in the south through the lines of the non-associate Duke Power Company.

C. *Carolina Power & Light Company*

(1) The location of the properties of the Carolina Power & Light Company, in its Eastern Division and Western Division has been noted. Its

generating facilities are all located in North Carolina. Details as to the business and operations of the Company are included in Table A of Exhibit 111. Generally, the distribution of its business and operations in the two states in 1934 was approximately as follows: 1681

	North Carolina Eastern	North Carolina Western	South Carolina	Company's Account in Tennessee
usiness:				
Communities served	166	*	49	—
Customers	54,100	*	15,600	—
ales—kwh				1682
To ultimate consumers	207,111,000	84,968,000	69,997,000	—
At wholesale for resale within state	133,081,000	2,039,000	3,267,000	227,946,000
Across state boundaries	36,768,000	180,152,000	—	—
Total sales	376,960,000	267,159,000	73,264,000	227,946,000
evenues				
From ultimate consumers	$ 6,192,800	*	$ 1,696,100	—
From wholesale sales within state	472,900	*	45,800	$ 556,900
Across state boundaries	327,700	*	—	—
Total electric revenues	$ 6,993,400	*	$ 1,741,900	$ 556,900
peration—kwh:				
eneration	318,877,000	301,986,000	—	—
urchases				
Within state	91,542,000	—	170,474,000	277,946,000
At state boundaries	7,723,000	—	—	—
ransfers into state	83,738,000	—	18,580,000	—
ransfers out of state	(*12,951,000*)	(*5,629,000*)	(*83,738,000*)	—
otal available in state	488,929,000	296,357,000	105,316,000	277,946,000

1683

* Totals for North Carolina shown under Eastern Division

Page Tightly Bound

(2) In volume measured by kilowatt hours, the
1684 business of the Company is about equally divided between retail distribution to ultimate consumers and sales at wholesale for resale. The volume of the wholesale business, as hereinafter noted, is, however, dependent to a great extent on the availability of surplus hydro-electric energy. The major part of the retail distribution is in the North Carolina portion of the Eastern Division.

(3) The Company's regular wholesale business consists of sales, largely in North Carolina, to non-
1685 associate companies which distribute in the state of purchase (approximately 56,000,000 kwh in 1934) and of sales to its associate Tennessee Public Service Company of practically the entire requirements of the latter Company (approximately 98,000,000 kwh in 1934). In addition to these regular wholesale transactions, which are largely firm power transactions, the Company sells surplus hydro-electric energy (approximately 83,000,000 kwh in 1934) to the Virginia Electric & Power Company at points in the Eastern Division of North Carolina, and sells to and interchanges with
1686 the Appalachian Electric Power Company surplus hydro-electric energy (in 1934 approximately 37,000,000 kwh of deliveries by the eastern division at the Virginia-North Carolina boundary and 147,000,000 kwh of deliveries by the western division over the lines of Tennessee Public Service Company and 12,000,000 kwh of receipts—8,000,000 at the Virginia-North Carolina boundary and 4,000,000 for its account in Tennessee). In addition to these surplus energy transactions, the Carolina

Company has from time to time in effect purchased in Tennessee substantial amounts of surplus hydro-electric energy (approximately 224,000,000 kwh in 1934) from the non-associates Tennessee Electric Power Company and Aluminum Company of America, which is delivered by them to the associate Tennessee Public Service Company, such purchases being used in part (approximately 63,000,000 kwh in 1934) to fulfill the Carolina Company's obligation to supply the requirements of Tennessee Company and in part (approximately 161,000,000 kwh in 1934) being resold to the Appalachian Company. In 1934, the Carolina Company also sold from its Western Division at the North Carolina-Tennessee boundary a small amount of surplus hydro-electric energy (approximately 2,000,000 kwh) to the non-associate Tennessee Electric Power Company, the energy being transmitted and delivered in Tennessee by the associate Tennessee Public Service Company. Sales from North Carolina to the associate Tennessee Public Service Company at the North Carolina-Tennessee boundary in 1934 were approximately 31,000,000 kwh. 1687 1688

(4) The Company's requirements in South Carolina are provided for under normal conditions by long-term power purchase contracts with non-associate companies. The purchases under these contracts (approximately 170,000,000 kwh in 1934) were substantially greater than the Company's requirements in South Carolina in 1934, resulting in substantial transfers of energy from South Carolina to North Carolina where it is commingled with other energy in the North Carolina system. In emergencies any deficiency in South Carolina sources is made good from North Carolina. 1689

(5) All of the transfers between the two States
1690 of North Carolina and South Carolina are over the Company's own lines and for its own account. The transfers from the Western Division into South Carolina, however, are delivered to the non-associate Duke Power Company which in turn concurrently delivers to the Eastern Division an equivalent amount of energy from its Wateree plant. In addition to the transfers between the two States listed in the above tabulation, in 1934 the Company transferred between two points on the North Carolina-Virginia boundary over the
1691 lines of the associate Roanoke River Power Company (a Virginia corporation) in Virginia approximately 76,500,000 kwh in an easterly direction and 1,600,000 kwh in a westerly direction; and there were transferred between points on the Company's system at the North Carolina-Virginia boundary and the North Carolina-Tennessee boundary over the lines of the Appalachian Electric Power Company and Tennessee Public Service Company approximately 4,000,000 kwh in an easterly direction and virtually nothing in a westerly direction.

1692

D. *Tennessee Public Service Company*
Holston River Electric Company

(1) As hereinabove described, these Companies operate an interconnected system in Tennessee. The Tennessee Public Service Company (a Maine corporation) has a small steam station at Knoxville which is used merely as a standby plant, and a minor hydro-electric plant which is regu-

larly operated. The Holston River Electric Company (a Tennessee corporation) has no generating facilities and purchases its entire requirements from Tennessee Public Service Company. In turn, the Tennessee Public Service Company regularly purchases practically all its requirements from the Carolina Power & Light Company. 1693

(2) The principal office and place of business of both these Companies is in Knoxville, Tennessee. Except for said sale of energy to the Holston Company by the Tennessee Company, their sales consist entirely of the sale of electric energy at retail to ultimate consumers in the State of Tennessee. In 1934 the sales of electric energy made by these Companies at retail were approximately 85,114,000 kwh to approximately 28,000 ultimate consumers residing in and near 31 communities in Tennessee, from which they derived approximately $2,260,000 in revenue. As above described, Tennessee Public Service Company also transmits, between the North Carolina-Tennessee boundary and Kingsport and other points in Tennessee, and between Kingsport and Knoxville, Tennessee, substantial amounts of energy for the account of the Carolina Company. The compensation for such transfers amounted to approximately $100,000 in 1934. 1694 1695

E. *Group Operation*

(1) The generating facilities of the Tennessee Public Service Company are inadequate to supply the requirements of that Company and of its associate Holston River Electric Company. The Ten-

nessee requirements are normally supplied by the
1696 Carolina Power & Light Company, in part with energy generated by its Western Division in North Carolina, and in part with energy (for the most part generated outside of Tennessee) delivered at Kingsport by the Appalachian Electric Power Company. At times Tennessee Public Service Company's purchases from Carolina Power & Light Company are in part supplied for the Carolina Company's account in Tennessee by non-associate companies which generate in the State but which also generate a minor part of their energy require-
1697 ments outside of the state and are directly or indirectly connected with companies outside of the State.

(2) As already noted, through the lines of Tennessee Public Service Company and Appalachian Electric Power Company in the north, and through the lines of the non-associate Duke Power Company in the south, the two divisions of the Carolina Power & Light Company are interconnected and are operated as one unified system. Under "concurrent exchange" agreements with
1698 these companies, the Carolina Company can demand, within certain broad limits, simultaneous and equivalent deliveries and receipts of energy into or out of the Eastern Division and out of or into the Western Division, as the case may be, thus effecting what is equivalent to direct transmission between the Divisions although the same energy may not pass from the point of delivery in one Division to the point of receipt in the other.

(3) The generating facilities in both Divisions of the Carolina Company are primarily hydro-

electric but include firming or standby steam plants. The Company for several years has had hydro- 1699
electric generating capacity and energy available in excess of the requirements of its own regular load, and in addition it normally has available seasonal surplus hydro-electric energy. The Company has accordingly entered into contractual arrangements with Appalachian Company under which it exchanges seasonal surplus hydro energy and at times sells other surplus hydro-electric energy. The exchanges and sales with the Appalachian Company are conducted in general as follows: Carolina Company during seasons of sur- 1700
plus hydro energy delivers energy to Appalachian, primarily during the peak hours of the Appalachian system. Energy so delivered to Appalachian Company may be "left" with Appalachian, in which case the delivery becomes a sale, or may at the option of the Carolina Company be "taken back" later by Carolina, in which case the delivery becomes an exchange. Energy when "taken back" by the Carolina Company is taken during the off-peak hours of the Appalachian system. These arrangements make possible substantial economies to both Companies. The Carolina Company receives off-peak 1701
energy during the low water seasons at lower cost than that which would result from starting and operating its own standby steam stations.

(4) In addition to the above described transactions, the Carolina Company from time to time sells additional surplus hydro-electric energy to the Appalachian Company and to the non-associate Virginia Electric & Power Company. It is

impracticable to determine the portions of the
1702 energy so sold to the latter company which are consumed in Virginia and North Carolina, respectively.

(5) The figures in regard to the operation of the constituent companies in this Carolina-Tennessee group in 1935 were as follows: (1) Of the approximate total of 674.3 million kwh handled by Eastern Division of the Carolina Company in North Carolina (generated in the State 383.6 million kwh and purchased from non-associates in the State
1703 92.5 million kwh), approximately 198.2 million kwh or 29.4 percent was received and approximately 150.9 million kwh or 22.4 percent was transmitted across the North Carolina-Virginia and North Carolina-South Carolina boundaries. Included in these figures for inward and outward movements of energy for North Carolina is all of the energy handled by the loop transmission line of Roanoke River Power Company in Virginia (approximately 96.1 million kwh, received and transmitted across the North Carolina-Virginia boundary); (2) Of the approximate
1704 total of 196.8 million kwh handled by Eastern Division of the Carolina Company in South Carolina, approximately 28.4 million kwh or 14.5 percent was received and 82 million kwh or 41.7 percent was transmitted across the North Carolina-South Carolina boundary. Approximately 12.3 million kwh, of this energy was received from Duke Power Company as its equivalent of the energy transmitted by the Western Division from North Carolina into South Carolina to Duke Power Com-

pany. The Eastern Division generated no energy in South Carolina but purchased in that state 168.4 million kwh from non-associates, all of which was generated in South Carolina; (3) of the approximate total of 322 million kwh handled by Western Division of the Carolina Company in North Carolina (generated in the State 315.6 million kwh, purchased from non-associates in the State none), 6.4 million kwh or 2.0 percent was received across the North Carolina-Tennessee boundary and approximately 200.3 million kwh or 62.2 percent was transmitted across North Carolina-Tennessee and North Carolina-South Carolina boundaries; (4) of the approximate total of 354.2 million kwh handled, irrespective of the division of operations between the Tennessee Public Service and Holston River Electric Companies, in Tennessee (generated in the State 0.50 million kwh and purchased 165.8 million kwh), approximately 194.4 million kwh or 54.9 percent was received and approximately 14.2 million kwh or 4 per cent was transmitted across the Tennessee-Virginia and Tennessee-North Carolina boundaries. 1705 1706

(6) The interconnections, hereinbefore noted, of the Carolina and Tennessee Companies in this group with the various systems of associate and non-associate companies, which operate or interconnect with other systems operating outside of the Carolinas and Tennessee, provide a significant amount of mutual service protection. In emergencies, shortage of power on any one of these systems may be in part made good by emergency power obtained from one or more of the other interconnected systems. 1707

(7) Further details of the group operations of
1708 these companies are set forth in table B of Exhibit 111.

150. *Pennsylvania Power & Light Company and Subsidiaries* (Pennsylvania)

A.

Exhibit 113 (map no. 18) is a map of the properties of this company as of 1935.

B. *History*

1709

(1) In 1920, when Pennsylvania Power & Light Company (a Pennsylvania corporation) was organized and a substantial majority of its voting securities were acquired by Lehigh Company, which subsequently has become a subsidiary of National Company, its electric properties consisted of electric generating plants, transmission lines and distribution systems located solely within Pennsylvania. Prior to this time these properties were partially interconnected among themselves, and certain interconnections existed with other un-
1710 related systems. Since 1920, Pennsylvania Power & Light Company has acquired additional utility properties and has made substantial additions to its own electric generating, transmission and distribution facilities, but all of its properties continue to be located solely within Pennsylvania. Since 1920, interconnections have been effected in Pennsylvania between the system of Pennsylvania Power & Light Company and the system of The Scranton Electric Company (a subsidiary of American Gas), and the two companies have con-

structed generating stations at Stanton, Pennsylvania, located side by side and operated in effect as one generating station through the medium of Stanton Operating Company (the stock of which is owned one-half by each of the two companies). 1711

Pennsylvania Power & Light Company established a minor interconnection at the Pennsylvania-New York boundary with a non-associate company operating in New York, for the purpose of obtaining electric energy to be distributed by Pennsylvania Power & Light Company in a town in Pennsylvania. This minor interconnection was in effect during 1934 and a part of 1935 but has been discontinued following the construction of a line connecting the town in question with the system of Pennsylvania Power & Light Company. 1712

(2) As a result of a joint undertaking with the non-associate Philadelphia Electric Company, operating in Pennsylvania, and the non-associate Public Service Electric & Gas Company, operating in New Jersey, there was completed in successive stages during the period 1928-1932 a high capacity interconnection between the three companies. This interconnection comprised an approximate triangle of 220,000-volt transmission lines with one corner located at the Siegfried substation of Pennsylvania Power & Light Company in Pennsylvania, one corner located at the Plymouth Meeting substation of Philadelphia Electric Company in Pennsylvania and one corner located at the Roseland substation of Public Service Electric & Gas Company in New Jersey. These lines cross the Pennsylvania-New Jersey boundary on the Delaware River near Bushkill where the facilities of Pennsylvania Power & Light Company 1713

and Public Service Electric & Gas Company meet,
1714 and at a lower point on the Delaware River where the facilities of Philadelphia Electric Company meet the facilities of Public Service Electric & Gas Company. Philadelphia Electric Company has other connections extending into Delaware and New Jersey and also into Maryland to the Conowingo hydro-electric plant which is operated by one of its associate companies.

(3) A substantial part of Pennsylvania Power & Light Company's system consists of its so-called Lancaster Division which is in interconnection with
1715 its main system, but not operated in synchronism therewith. The major electric energy supply for the Lancaster Division is obtained from the Safe Harbor and Holtwood plants on the Susquehanna River, owned by non-associate companies, and the remainder is normally obtained from local plants owned by the Company and from its main system (since 1935). While these plants are connected to lines extending into Maryland, the energy purchased for the Lancaster Division is generated in Pennsylvania by these two plants.

1716 (4) The principal office and place of business of Pennsylvania Power & Light Company is in Allentown, Pennsylvania.

C. *Business and Operations*

(1) Table A of Exhibit 111 contains details of the business and operations of Pennsylvania Power & Light Company. Its business and operations in 1934 were generally as follows:

Pennsylvania Power & Light Company 1717

	Main System	*Isolated Systems*	
Business			
Customers	359,000	**	
Communities served	640	**	
Energy deliveries—kwh			
To ultimate consumers	1,156,573,000	133,428,000	
At wholesale for resale			
Within the state	258,028,000	76,000	
At state boundary	26,478,000	—	
Total energy deliveries	1,441,079,000	133,504,000	1718
Electric revenues			
From ultimate consumers	$ 27,628,000	$3,923,000	
From wholesale sales			
Within the state	589,000*	500	
At state boundary	63,000*	—	
Total electric revenues	$ 28,280,000*	$3,923,500	
Operation—kwh			
Generation	1,265,723,000	3,880,000	
Purchases			
Within the state	328,571,000	140,059,000	1719
At state boundary	18,314,000	—	
Total available	1,612,608,000	143,939,000	

** Included in main system.

* For purposes of this statement there are included in revenues from wholesale sales $317,429 received from interchange transactions and in company's books not credited to revenues but to production expense.

(2) The electric sales of the company consist
1720 principally in the retail distribution of electric energy to ultimate consumers.

(3) The wholesale sales consist predominantly of sales within Pennsylvania of energy which is distributed in that state. Included in 1934 were interchange sales of non-firm economy energy to Philadelphia Electric Company over the 220,000-volt triangle, hereinbefore referred to, of 87,910,000 kwh, with receipts therefrom of $205,000. Included also were minor sales (67,000 kwh) to The Scranton Electric Company. The deliveries at the state boun-
1721 dary were all of non-firm economy energy to the non-associate Public Service Electric & Gas Company over the Pennsylvania-New Jersey boundary.

(4) The Company generates by far the greater part of its requirements. The purchases within the state included 66,256,000 kwh in 1934, mainly non-firm economy energy, from Philadelphia Electric Company over the 220,000-volt interconnection (a part of which energy probably originated in the Conowingo hydro-electric plant, although com-
1722 mingled in Philadelphia Electric Company's substation at Plymouth Meeting with energy generated in Pennsylvania). Included also in the purchases within the state in 1934 were 361,000 kwh from The Scranton Electric Company. The energy purchased in 1934 at state boundaries comprised 18,301,000 kwh, mainly non-firm economy energy, from Public Service Electric & Gas Company and 13,000 kwh of firm energy from a non-associate in New York for supply to an isolated town in Pennsylvania now discontinued.

(5) The project for high capacity interconnections, eventually effected as above described, between the systems of Pennsylvania Power & Light Company, Philadelphia Electric Company and Public Service Electric & Gas Company, had been studied for many years. The 220,000-volt interconnection was built after joint committees of engineers and executives, on which the three companies were represented (some of the representatives of Pennsylvania Power & Light Company being officers and employees of Bond and Share), had made an extensive and elaborate study of the situation. As indicated in the report of the engineering committee of August 1, 1925, substantial mutual benefits and savings were anticipated as a result of the interconnection, due largely to diversity between the load of the Pennsylvania Power & Light Company, which serves a large coal mining and industrial load and consequently has a day-time peak demand and an autumn seasonal peak, and the load of the other companies, which primarily serve residential, commercial and transportation consumers and consequently have an evening daily peak and a seasonal winter peak. The report noted that, due to this diversity, the combined generating capacity needed to meet the combined load of the three companies would be less than if the capacities of the respective companies were not pooled; and that increase in the capacities of the respective companies, which would become necessary in the absence of interconnection, could be delayed and eventually staggered in relation to their combined needs. At the present time, financial savings, as estimated in the report have not been realized,

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largely because the anticipated increases in load
1726 have not materialized and partly for other reasons.

SUBSIDIARIES OF AMERICAN GAS

151. *The Ohio Power Company* (Ohio and a plant in W. Va.), *Wheeling Electric Company* (W. Va. and Ohio), *Indiana & Michigan Electric Company* (Ind. and Mich.), *Indiana General Service Company* (Ind.), *Southern Ohio Public Service Company* (Ohio), *Kanawha Valley Power Company* (W. Va.), *Appalachian*
1727 *Electric Power Company* and its two wholly owned subsidiaries (Va., W. Va. and Tenn.), *Kentucky and West Virginia Power Company, Inc.* (Ky.) and *Kingsport Utilities, Incorporated* (Tenn.)

A.

Exhibit 113 (Map Nos. 19 and 20) are maps of the properties of these companies as of 1935.

B. *History*

1728

(1) At organization of original American Gas in 1906, it acquired (among others) companies serving Muncie and Marion, Indiana; Canton and Bridgeport, Ohio, and Wheeling, West Virginia. Through the course of the intervening thirty years these properties have been extended and additional properties have been acquired by the operating companies (either directly or through American Gas) and by American Gas (through stock acquisi-

tion) until today there is interconnection of transmission systems of operating subsidiaries of American Gas embracing the following named companies which are successors to the companies above named or to companies serving adjacent territory and subsequently acquired: 1729

1 *The Ohio Power Company* (an Ohio corporation) is successor to Canton Electric Company, acquired by original American Gas in 1906. Between 1907 and about 1913 additional properties were acquired serving communities in northwestern and central Ohio, and some connecting transmission lines were constructed but none reaching to or near the State boundary. Between 1913 and 1917 additional properties serving territory along the Ohio-West Virginia boundary at East Liverpool and Steubenville and vicinity in Ohio were acquired; and the Company in conjunction with the non-associate West Penn Power Company built a power plant on the West Virginia side of the Ohio-West Virginia boundary (the Ohio River) and connected thereto its transmission system in Ohio, thus forming an interconnection with the transmission system of West Penn Power Company. Other important properties serving communities in central and northwest Ohio were added in the period subsequent to 1917; and through 1924 and subsequent years there were acquired several properties in the southerly part of Ohio, one of which had transmission connections to companies in Ken- 1730 1731

tucky and West Virginia. Construction of
1732 132 kv transmission lines within the State, and of 132 kv transmission lines to State boundaries was carried out. A 132 kv line from Lima to the Indiana state boundary (for energy transfers with the associate Indiana & Michigan Electric Company) was completed in 1925, and a 132 kv line from Philo to the West Virginia boundary (for energy transfers with the associated Appalachian Electric Power Company) was completed in 1926. The construction of a 132 kv line from Philo to Fostoria in 1929 made a solid 132 kv line
1733 from the West Virginia boundary to the Indiana boundary. Interconnections at 132 kv or 66 kv with non-associates Ohio Public Service Company, Toledo Edison Company, and the Ohio Edison Company have been made wholly within the State of Ohio, for energy interchange or sale, and are still in operation.

2 *Indiana & Michigan Electric Company* (an Indiana corporation) is successor to Indiana and Michigan Electric Company, acquired by original American Gas in 1922. Indiana and
1734 Michigan Electric Company had an interconnected transmission system serving communities owned in northern Indiana and southern Michigan. A group of relatively small properties in northeastern Indiana was acquired in 1923, which group of small properties is not connected to the transmission system of the main body of the company's properties but rather receives all its energy requirements at 33kv at the Ohio-Indiana

boundary from the associate The Ohio Power Company. A new steam generating plant near 1735
South Bend, Indiana was built and the new Indiana & Michigan Electric Company formed in 1925. A 132 kv line from South Bend to Fort Wayne and to the Ohio State boundary (for sale of energy to the non-associate Indiana Service Corp. and sale or interchange of energy with the associate The Ohio Power Company) was completed in 1925. Construction of a 132 kv line from Fort Wayne to Marion, and thence to a point near Kokomo, Indiana (for the sale of energy to the associate 1736
Indiana General Service Company and interchange of energy with the non-associate Northern Indiana Power Company) was completed in 1928. Interconnections at 132 kv with non-associates Northern Indiana Power Company and Northern Indiana Public Service Company have been made wholly within the State of Indiana, for energy interchange and are still in operation. The Northern Indiana Public Service Company is interconnected with the power pool serving Chicago and surrounding territory. 1737

3 *Indiana General Service Company* (an Indiana corporation) is successor to Marion Light and Heating Company and Muncie Electric Light Company, acquired by the original American Gas in 1906. Properties serving communities in adjacent territory were acquired and connection of transmission facilities was established through the period from 1910 to date. In 1928 the Company built 132 kv line from Marion to Muncie and connected with the 132 kv line of the associate Indiana & Michigan Electric Company

just completed from Fort Wayne to Marion,
1738 and now buys from that company most of its requirements of energy.

4 *Wheeling Electric Company* (a West Virginia corporation) is successor to Wheeling Electrical Company, acquired by original American Gas in 1906. The company built a plant at Wheeling, acquired additional properties on both the Ohio (where its distribution lines connect with lines of the associate The Ohio Power Company) and the West Virginia sides of the state boundary (the
1739 Ohio River), and extended its transmission facilities. In 1921 it constructed a 66 kv line from Wheeling north to the newly constructed Windsor plant of The Ohio Power Company at Power, W. Va. and buys thereat most of its requirements of energy. The Company's 66 kv transmission lines (all in West Virginia) interconnect at several points on the Ohio-West Virginia boundary (the Ohio River) with the lines of the associate The Ohio Power Company for the delivery and
1740 interchange of energy under an agreement for the furnishing of power supply to the company. The company's 66 kv transmission lines are also interconnected with those of the Monongahela West Penn Public Service Company, which operates in West Virginia.

5 *Appalachian Electric Power Company* (a Virginia corporation was organized as a subsidiary of American Gas in 1926, to consolidate into one company the operating electric properties in Virginia and West Virginia acquired by American Gas subsequent

to 1921. By 1926 American Gas owned seven major operating companies and more than a score of smaller ones in those two states. Interconnection of some of the properties existed prior to acquisition, including transmission lines across state boundaries: the property of Appalachian Power Company at Bluefield, West Virginia was connected by transmission line to the property of Roanoke Railway and Electric Company at Roanoke, Virginia; the property of Virginian Power Company near Charleston, West Virginia was connected by transmission line to the property of Consolidated Power and Light Company at Huntington, West Virginia; the property of Consolidated Power and Light Company was connected by transmission lines to the property of the associate Boyd County Electric Company in Ashland, Kentucky. The system of Appalachian Power Company was an interconnected system serving parts of two states in the general vicinity of Bluefield, West Virginia. American Gas caused to be built sections of a 132 kv line, and construction of that line linking the properties of the Appalachian Electric Power Company proper was completed in 1927. The 132 kv line from Roanoke to the Virginia-North Carolina boundary was completed in 1926. The 132 kv line from Saltville, Virginia to the Virginia-Tennessee boundary was completed in 1927. These lines to state boundaries were and are utilized for power purchase or interchange with Carolina Power & Light Company and its associate, Tennessee Public Service Company, subsidiaries of National Company. The 132 kv line from Turner to the West Virginia-Ohio State

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1744 boundary for an interchange arrangement with the associate The Ohio Power Company was completed in 1926. The line from Logan to the West Virginia-Kentucky boundary was rebuilt for 132 kv operation in 1926. The 132 kv line from the Virginia-Tennessee boundary to Kingsport, Tennessee was built by the Kingsport Utilities, Incorporated but acquired by Appalachian Electric Power Company from that company in 1934. It was and is used not only in connection with supply of energy to the associate Kingsport Utilities, Incorporated, but also in connection with the
1745 power supply and interchange with the Carolina Power & Light Company (through Tennessee Public Service Company). The Company has connections for interchange or supply of power with Carolina Power & Light Company (and Tennessee Public Service Company) with the associate Kentucky and West Virginia Power Company, Inc. and The Ohio Power Company.

6 *Kentucky and West Virginia Power Company Inc.* (a Kentucky corporation) was organized
1746 in 1919 and when acquired by the original American Gas in 1922 it consisted of interconnected properties in southwest West Virginia and eastern Kentucky. In 1926 its West Virginia properties were transferred to Appalachian Electric Power Company and it acquired properties then controlled by American Gas in northeast Kentucky. Its operations are now confined to Kentucky. It has a power purchase and interchange arrangement with its parent company Appalachian Electric Power Company under which most of the Company's energy requirements

are purchased. Its transmission lines are interconnected with The Ohio Power Company (as well as with Appalachian Electric Power Company) but energy interchanged with The Ohio Power Company is settled for with Appalachian Company, which in turn includes it in settlement between the Ohio Power Company and that company. 1747

7 *Kingsport Utilities, Incorporated* (a Virginia corporation) organized in 1917 serving Kingsport, Tennessee, was acquired by American Gas in 1925. It was sold to Appalachian Electric Power Company in 1928 and is now a wholly owned subsidiary of that company. It owned a 132 kv line from Kingsport north to the Virginia boundary, used for purchase of energy from Appalachian Electric Power Company and interchange of power between Appalachian Company and Tennessee Public Service Company. In 1934 this 132 kv line was sold to Appalachian Company and now Kingsport Utilities, Incorporated does only a distribution business in and about Kingsport, with small sales from a distribution line across the state boundary to the Appalachian Company in Virginia. 1748 1749

C. *Indiana & Michigan Electric Company*

(1) This company, with its center of operation around South Bend, Indiana, operates an interconnected system including generating plants, transmission lines and distribution facilities in Michigan and Indiana. Details as to business and operations of the company are included in Table "A" of Exhibit 111. Generally, the distribution of its business and operation in the two states in 1934 was approximately as follows:

		Interconnected-Systems	
1750		*Indiana*	*Michigan*
	Business		
	Customers	44,131	19,586
	Communities Served	24	34
	Energy Sales—kwh		
	To Ultimate Consumers	96,832,000	47,882,000
	At Wholesale for Resale— in the State	292,324,000	9,126,000
	At Wholesale for Resale— at State Boundary	8,242,000	—
1751	Total Sales	397,398,000	57,008,000
	Electric Revenues		
	From Ultimate Consumers	$3,008,200	$1,348,600
	From Wholesale Sales— In the State	1,943,800	87,400
	From Wholesale Sales— at State Boundary	63,900	—
	Total Electric Revenues	$5,015,900	$1,436,000
	Operation—kwh		
	Generation	97,173,000	33,468,000
1752	Purchases in State	293,000	—
	Purchases at State Boundary	369,322,000	—
	Transfers into State	9,036,000	42,495,000
	Transfers out of State	(*42,495,000*)	(*9,036,000*)
	Interchange Receipts	58,393,000	—
	Interchange Deliveries	(*64,891,000*)	—
	Total Available in State	426,861,000	66,927,000

(2) In volume, the sales at wholesale for resale constitute the preponderant part (approximately 68 per cent.) and retail distribution to ultimate consumers the smaller part (approximately 32 per cent.) of the total business of the company. In addition to the sales at wholesale for resale proper, the company delivers in the course of interchange transactions, with the non-associate Northern Indiana Public Service Company, substantial amounts of energy. All of these deliveries and almost all of the sales at wholesale are made in Indiana. About half the total wholesale sales are of energy at transmission voltage to the associate Indiana General Service Company. Retail distribution in Indiana is about twice that in Michigan. 1753 1754

(3) Although the Company is self-sufficient as regards generating capacity, for reasons hereinafter described it purchases at the Indiana-Ohio boundary from its associate The Ohio Power Company surplus or economy power available from that company, which has amounted to approximately 65 per cent. of its requirements, and generates, largely in Indiana, (where 90 per cent. of its generating capacity is located) the balance of its total requirements. In addition, it offsets, by receipts from the Northern Indiana Public Service Company, substantial amounts of energy which it delivers to that company in the course of interchange transactions, as hereinabove noted. 1755

(4) In addition to the large transfers at transmission voltage across the Indiana-Ohio boundary, involved in the purchases from its associate, The Ohio Power Company, substantial transfers over

the lines of the company across the Indiana-Michi-
1756 gan boundary, as indicated in the above tabulation, are involved in the operation of the company's system. The energy bought by the company at the state boundary for its customers in the vicinity of Butler, Indiana, is not commingled with other energy, but this amounts to only one per cent. of total company sales to ultimate consumers. Practically all the other energy moving to the company across state boundaries, commingles before sale with energy generated or purchased in the state *except* that part of the energy sold at wholesale to
1757 the associate Indiana General Service Company and to the non-associate Indiana Service Corporation is energy bought at a state boundary and not commingled. The amount of energy covered by such exception is not computed. In this tabulation there is included in the total of transfers across this boundary, the delivery of a relatively small amount (approximately eight million kwh in 1934) of energy delivered in Indiana by the company to a non-associate for distribution in Michigan. The flow of energy in the course of transfers across this boundary is regularly a preponderant flow from
1758 Indiana to Michigan.

D. *Indiana General Service Company*

(1) This company operates a system in Indiana centering around Marion and Muncie. Details as to business and operations of the company are included in Table "A" of Exhibit 111. Generally, its business and operations in 1934 were approximately as follows:

	Indiana	
Business		1759
Customers	36,588	
Communities Served	45	
Energy Sales—kwh		
To Ultimate Consumers	126,960,000	
At Wholesale for Resale	1,515,000	
Total Sales	128,475,000	
Electric Revenues		
From Ultimate Consumers	$2,890,300	
From Wholesale Sales	26,900	
Total Electric Revenues	$2,917,200	1760
Operation—kwh		
Generation	2,071,000	
Purchases	143,870,000	
Total Available in State	145,941,000	

(2) The sales of the company, hereinabove described, consist almost entirely of retail distribution to ultimate consumers in Indiana. It sells at wholesale a small amount of energy for resale in the state. It has no lines extending to or near any state boundary. Although the company has generating capacity, it is not adequate to meet its full requirements; therefore it purchases within the state almost all of its total requirements at transmission voltage at Marion, Indiana from its associate the Indiana & Michigan Electric Company. 1761

E. *The Ohio Power Company*

(1) This company operates throughout an extensive territory in Ohio. Details as to business and operations of the company are included in Table "A" of Exhibit 111. Generally, the distribution of its business and operations in the two states in 1934 was approximately as follows:

		Interconnected System	
1762		*Ohio*	*West Virginia*
	Business		
	Customers	215,521	1
	Communities Served	466	—
	Energy Sales—kwh		
	To Ultimate Consumers	691,246,000	—
	At Wholesale for Resale—in the State	204,229,000	89,087,000
	At Wholesale for Resale—at State Boundary	488,992,000	—
	Total Sales	1,384,467,000	89,087,000
1763	*Delivered for Others*	340,276,000	—
	Electric Revenues		
	From Ultimate Consumers	$15,513,000	—
	From Wholesale Sales in the State	941,800	$ 733,300
	From Wholesale Sales at State Boundary	889,700	—
	Total Electric Revenues	$17,344,500	733,300
	Operation—kwh		
	Generation	1,354,108,000	105,796,000
1764	Generation for Others	—	340,276,000
	Purchases In State	2,550,000	—
	Purchases at State Boundary	165,156,000	—
	Transfers into State	16,709,000	—
	Transfers into State for Others	340,276,000	—
	Transfers out of State	—	*(16,709,000)*
	Transfers out of State for Others	—	*(340,276,000)*
	Interchange Receipts	41,809,000	—
	Interchange Deliveries	*(41,809,000)*	—
	Total Available in State	1,878,799,000	89,087,000

(2) In volume, the total sales of the company are approximately equally divided between sales at wholesale for resale and retail distribution to ultimate consumers. 1765

(3) The retail business is entirely confined to Ohio.

(4) The sale at state boundaries constitute a preponderant part of the company's wholesale business. In 1934 these sales, approximately 489 million kwh, were distributed as follows: approximately 369 million kwh at the Ohio-Indiana boundary to its associate the Indiana & Michigan Electric Company, approximately 120 million kwh at the Ohio-West Virginia and Ohio-Kentucky boundaries to its associates the Appalachian Electric Power Company and the Kentucky and West Virginia Power Company, Inc., and approximately 600,000 kwh to non-associates across the Pennsylvania-Ohio boundary. In addition to these sales at state boundaries, the company regularly transmits into Ohio the major part of the energy generated at its Windsor plant in West Virginia, in 1934 approximately 17 million kwh for its own account and 340 million kwh for the account of non-associate companies (shown in the above tabulation as "Delivered for Others") representing energy generated under lease of capacity to them in West Virginia. It likewise transmits over its own lines into Ohio for account of West Penn Power Company a small amount of energy generated by the non-associate West Penn Power Company in its half of the Windsor plant. The sales at state boundaries and 1766 1767

1768 the transfers into Ohio from the Windsor plant, hereinabove described, account for all the movements across state boundaries over the transmission lines of The Ohio Power Company.

(5) The sales at wholesale for resale in Ohio, with the exception of a small amount of energy sold to its associate Wheeling Electric Company near the Ohio-West Virginia boundary, are to non-associate companies for resale in the state. The wholesale sales in West Virginia, which are relatively small in proportion to business in Ohio, are all to the Wheeling Electric Company.

1769

(6) The Ohio Power Company generates almost all of its total requirements, and purchases (with the exception of relatively small amounts at the Ohio-West Virginia and Ohio-Indiana boundaries from its associates the Appalachian Electric Power and Indiana & Michigan Electric Companies, respectively) the balance from companies which generate in Ohio. The company's generating capacity in Ohio is not completely adequate to meet its requirements in the state. It normally generates in

1770 Ohio approximately 75 per cent. and at the Windsor plant, where capacity is in excess of West Virginia requirements, 25 per cent. of its total generation. The arrangement with respect to the Windsor plant between the company and the non-associate West Penn Power Company, each of which owns a specific one-half of the generating capacity and also one-half of the stock of Beech Bottom Power Company, Inc. that operates the plant, is that each is entitled to the capacity which it owns and to any unused capacity of the other.

(7) Of the energy moving across a state boundary on the company's own lines, more than ninety per cent. is energy generated and transmitted for account of others and not constituting a sale of energy. Of the energy bought by the company at the state boundary, approximately ninety-five per cent. is commingled with energy generated in the state before delivery to customers. 1771

F. *Southern Ohio Public Service Company*

This company, acquired by American Gas in 1928, owns a generating plant in the City of Zanesville, Ohio, the entire output of which is regularly sold at wholesale in Ohio to its associate The Ohio Power Company. The gross operating revenue of the company in 1934 was approximately $12,000. 1772

G. *Wheeling Electric Company*

(1) This company, with its center of operations around Wheeling, West Virginia, operates transmission and distribution facilities in northeastern West Virginia, where it also has one minor generating plant, and distribution facilities in adjacent territory in Ohio. Details as to business and operations of the company are included in Table "A" of Exhibit 111. Generally, the distribution of its business and operations in the two states in 1934 was approximately as follows: 1773

1774

	Interconnected System	
	West Virginia	*Ohio*
Business		
Customers	24,184	6,078
Communities Served	9	4
Energy Sales—kwh		
To Ultimate Consumers	73,327,000	8,157,000
At Wholesale for Resale	—	—
Total Sales	73,327,000	8,157,000
Electric Revenues—kwh		
From Ultimate Consumers	$1,964,900	$310,300
1775 From Wholesale Sales	—	—
Total Electric Revenues	$1,964,900	$310,300
Operation—kwh		
Generation	1,221,000	—
Purchases	89,087,000	8,626,000
Transfers into State	—	1,881,000
Transfers out of State	(*1,881,000*)	—
Total Available in State	88,427,000	10,507,000

1776

(2) The sales of the company, hereinabove described, consist entirely of retail distribution to ultimate consumers, approximately 90 per cent. in West Virginia and 10 per cent. in Ohio. The company's plant in West Virginia is not adequate to meet its full requirements and is operated on a stand-by basis. It regularly purchases within the state practically all of its requirements from its associate The Ohio Power Company, for the most part at the Windsor plant and to a minor extent in Ohio. The company regularly transmits over

its own line and for its own account in both directions across the West Virginia-Ohio boundary, the net flow being from West Virginia into Ohio. Due to the method of operation of the company's system it is impracticable to determine precisely how much of the energy distributed by the company in Ohio was purchased there. 1777

H. *Appalachian Electric Power Company*

(1) This company, with its principal office at Roanoke, Virginia, operates an extensive system throughout southern West Virginia and Southwestern Virginia, including generating plants in both states, and owns a transmission line extending across the Virginia-Tennessee boundary. Details as to the business and operations of the company are included in Table "A" of Exhibit 111. Generally, the distribution of its business and operations in the three states in 1934 was approximately as follows: 1778

	Interconnected System			
	Virginia	*West Virginia*	*Tennessee*	
Business				
Customers	46,182	76,050	1	1779
Communities Served	105	356	—	
Energy Sales—kwh				
To Ultimate Consumers,	248,490,000	800,414,000	—	
At Wholesale for Resale in State,	3,832,000	9,276,000	31,816,000	
At Wholesale for Resale at State Boundary	8,485,000	254,625,000	—	
Total Sales	260,807,000	1,064,315,000	31,816,000	

	Electric Revenues			
1780	From Ultimate Consumers	$4,357,500	$11,923,000	—
	From Wholesale Sales in the State	48,800	156,700	$75,000
	From Wholesale Sales at State Boundary	1,072,000*	—	—
	Total Electric Revenues	$17,558,000		$75,000

* Total Virginia and West Virginia revenues for wholesale sales at state boundary.

		Virginia	*West Virginia*	*Tennessee*
	Operation—kwh			
1781	Generation	388,960,000	694,984,000	—
	Purchases within the State	8,772,000	—	308,121,000
	Purchases at State Boundary	25,042,000	78,850,000	—
	Transfers into State	437,541,000	496,227,000	36,028,000
	Transfers out of State	(*532,255,000*)	(*125,208,000*)	(*312,333,000*)
	Interchange Receipts	12,634,000	5,121,000	4,212,000
	Interchange Deliveries	(*12,634,000*)	(*5,121,000*)	(*4,212,000*)
1782	Total Available in State	328,060,000	1,144,853,000	31,816,000

(2) The sales of the company hereinabove described consist primarily of retail distribution to ultimate consumers, about three-quarters of this retail business being in West Virginia and one-quarter in Virginia.

(3) The company's sales at wholesale for resale in the three states are relatively minor, consisting for the most part of sales at Kingsport, Tennessee to its subsidiary Kingsport Utilities, Incorporated. The sales at wholesale at state boundaries are substantial, although for reasons hereinafter described, the amount thereof varies considerably from year to year depending upon the amount sold at the West Virginia-Ohio boundary to its associate The Ohio Power Company (approximately 164 million kwh in 1934). The balance of these boundary sales are respectively, to its subsidiary Kentucky and West Virginia Power Company, Inc. at different points on the West Virginia-Kentucky boundary and Virginia-Kentucky boundary (approximately 96 million kwh in 1934), and to the Carolina Power & Light Company at the Virginia-North Carolina boundary and at Kingsport, Tennessee in the course of interchange and purchase transactions hereinafter more fully described. 1783 1784

(4) Although the company is self-sufficient as regards generating capacity, for reasons hereinafter described it generated in 1934 only about two-thirds of its total requirements. It purchases almost the entire balance of its requirements from its associates, in 1934, approximately 78 million kwh from The Ohio Power Company at the Ohio-West Virginia boundary and 333 million kwh from the Carolina Power & Light Company. Most of the energy purchased from the latter company in 1934 was received at Kingsport, Tennessee and was imported across the Tennessee-Virginia boundary rather than at the Virginia-North Carolina 1785

1786 boundary connection near Danville. These purchases were in the course of purchase and sale and interchange transactions in which the Appalachian Electric Power Company and the Carolina Power & Light Company regularly engage, as hereinabove noted.

(5) With the exception of a small amount of transfers in 1934 between Kingsport and the Danville connection over its lines in Tennessee, Virginia and West Virginia in the course of such interchange transaction, all the transfers across
1787 state boundaries in the operation of the company's system in 1934 consisted of the boundary purchases and sales, hereinabove described, and the transfers over its own lines and for its account over the Virginia and West Virginia and Virginia-Tennessee boundaries.

(6) The energy sold to the associate Kingsport Utilities, in Tennessee, is energy brought from outside the state. With this exception, practically all the energy moving over the company's own lines across state boundaries or bought at a state
1788 boundary is commingled with energy generated in the state before delivery to customers.

I. *Kanawha Valley Power Company*

This company, organized as a subsidiary of American Gas Company in 1931, began operation of generating plants in West Virginia in 1935 and sells the entire output of such plants at wholesale for resale to its associate, the Appalachian Electric Power Company.

J. Kentucky and West Virginia Power Company, Inc. 1789

(1) This company operates two transmission and distribution systems in Kentucky which are interconnected with each other only through lines of its associates outside of the state. It has a small generating plant in its system in southern Kentucky. Details as to business and operations of the company are included in Table "A" of Exhibit 111. Generally, the distribution of its business and operations in 1934 was as follows:

1790

Business	
Customers	18,328
Communities Served	92
Energy Sales—kwh	
To Ultimate Consumers	170,392,000
At Wholesale for Resale	794,000
Total Sales	171,186,000
Electric Revenues—	
From Ultimate Consumers	$2,706,300
From Wholesale Sales	14,000
Total Electric Revenues	$2,720,300
Operation—kwh	
Generation	37,873,000
Purchases	140,418,000
Interchange Receipts	6,036,000
Interchange Deliveries	(*6,036,000*)
Total Available in State	178,291,000

1791

(2) The sales of the company, hereinabove
1792 described, consist almost entirely of retail distribution to ultimate consumers in Kentucky. The company is not self-sufficient in regard to generating capacity. In 1934 it generated approximately twenty per cent. of its total requirements at its plant in its system in the southern part of the state, purchasing the balance of its needs for that system at the Kentucky-West Virginia boundary from its associate the Appalachian Electric Power Company, and the entire needs of its northern system at another point on the boundary from that company
1793 and at the Kentucky-Ohio boundary from its associate The Ohio Power Company.

K. *Kingsport Utilities, Incorporated*

(1) This company does a distribution business in and about Kingsport, Tennessee, and sells small quantities of energy at wholesale for resale at the state boundary to Appalachian Electric Power Company in Virginia. Generally, its business and operations in 1934 was as follows:

1794

Business	
Customers	3,365
Communities Served	1
Energy Sales—kwh	
To Ultimate Consumers	27,895,000
At Wholesale for Resale at State Line	2,000
Total Sales	27,897,000

Electric Revenues		
From Ultimate Consumers	$435,700	1795
From Wholesale Sales at State Line	100	
Total Electric Revenues	$435,800	
Operation—kwh		
Generation	—	
Purchases	31,816,000	
Total Available in State	31,816,000	

1796

(2) The company is not self-sufficient in generating capacity and in 1934 purchased its entire requirements of energy from Appalachian Electric Power Company.

L. *Group Operation*

(1) As hereinabove noted, the systems of all the above mentioned subsidiaries of American Gas are interconnected by transmission lines, the most noteworthy of which is a "backbone" 132 kv transmission line, nearly 1,000 miles long, extending from Kingsport, Tennessee through Virginia, West Virginia, Ohio, Indiana and into Michigan, with branches into Kentucky and to the North Carolina-Virginia boundary, resulting from the separate construction of lines by the individual subsidiaries but all under the engineering direction of American Gas. These companies as a group constitute one of the largest interconnected systems, both in extent of territory served and volume

1797

of energy handled, operated by subsidiaries of a
1798 single holding company in the world. The "backbone" line not only interconnects most of these companies, but to it are connected several other important systems of non-associate companies in Ohio, Illinois and Pennsylvania.

(2) While in general the policy of American Gas has been to have each of the larger companies in this interconnected system develop sufficient generating capacity to supply its normal requirements and this policy has been carried out, the
132 kv line has been used to effect intercompany
1799 delivery of energy on a substantial scale. Likewise, energy has regularly moved in substantial amounts over the southern termini of the line from Carolina Power & Light Company.

(3) The generating capacity of this group of companies consists almost exclusively of steam plants. The major plants in the northern part of this system are the Twin Branch plant of the Indiana & Michigan Electric Company, near South Bend, Indiana, and the Philo and Windsor plants
of The Ohio Power Company near Zanesville, Ohio
1800 and at Power, West Virginia, respectively. In the southern part of the system the Cabin Creek and Logan plants in West Virginia and the Glen Lyn Plant in Virginia, of the Appalachian Electric Power Company, are the most important ones. These are all steam plants. As the respective service areas of these major generating companies expanded and tended toward fringe interconnection with each other, the backbone transmission line

was extended, beyond the need for integrating the respective properties of these companies or for 1801
establishing or reinforcing connections with the smaller companies dependent upon the major generating centers, to effect interconnection between these major generating centers in order to accomplish economies in emergency protection, staggering of construction of additional generating capacity, and saving through maximum use of more efficient plants.

(4) Under present conditions and method of operation, the following advantages result from and 1802
the following factors explain, generally, the flow and interchange of energy between the areas of the major generating companies in the northern part of the system. Although the thermal efficiency (i. e. average number of kwh generated per Btu of coal used) of the Twin Branch plant in Indiana is approximately equal to that of the Philo plant in Ohio, the cost of generation at the former is very much higher than the cost at the latter, due to the fact that the Philo plant is located right in the coal fields whereas the Twin Branch plant must burn coal which is transported considerable dis- 1803
tances. The relative cheapness of generation at the Philo plant and the fact that for many hours each day the Ohio customers are imposing on the Philo plant less than peak load, thus leaving available capacity which can be used to generate energy for Indiana, explains in large part the regular flow of energy from Ohio into Indiana hereinabove noted in the description of the specific companies involved. The other advantages, i. e. emergency supply, etc., result from this as well as the other inter-

connections. These movements across state boun-
1804 daries are reflected in the following analysis of the operations of the group, irrespective of the division of operation between the constituent companies, in each of the respective states concerned, i. e. Michigan, Indiana, Ohio, and the part of the system (The Windsor plant and the Wheeling Electric Company's system) in the northern part of West Virginia.

(5) Of the approximate total of 76 million kwh handled in *Michigan* in 1934 (generated in the
1805 state, 33.5 million kwh; purchased from non-associates in the state, none), approximately 42.5 million kwh or 56 per cent. was received and approximately 9 million kwh or 12 per cent. was transmitted across the Michigan-Indiana boundary. Of the approximate total of 536 million kwh handled in *Indiana* in 1934 (generated in the state 99 million kwh, received from non-associates in the state 59 million kwh), approximately 378 million kwh or 71 per cent. was received and 51 million kwh or 9 per cent. was transmitted across the Indiana-Michigan and Indiana-Ohio boundaries. Of the ap-
1806 proximate total of 1,931 million kwh handled in *Ohio* in 1934 (generated in the state, 1,354 million kwh, purchased from non-associates in the state 41 million kwh), 534 million kwh or 28 per cent. was received and 490 million kwh or 25 per cent. was transmitted across the Ohio-Indiana, Ohio-Pennsylvania, Ohio-West Virginia and Ohio-Kentucky boundaries. Of the approximate total of 456 million kwh handled in the part of the system in northern *West Virginia* in 1934 (generated in the

state 447 million kwh, received from non-associates in the state 9 million kwh), approximately 368 million kwh or 81 per cent. was transmitted and a negligible amount was received across the West Virginia-Ohio boundary. 1807

(6) Under present conditions and methods of operation, the interchange and flow between the northern and the southern portions of the group system is largely due to the fact that there is some peak diversity between the load of The Ohio Power Company and that of the Appalachian Electric Power Company and to the fact that Appalachian Company has hydro-electric energy from its own system and from others which at times it may advantageously relay into an interchange with The Ohio Power Company. The other advantages, i. e. emergency supply, etc. result from these as well as other interconnections. The major generating plants of the two companies are located in or near coal producing areas and generating costs are more nearly equal. As hereinabove noted, the Appalachian Electric Power Company regularly purchases energy from, and interchanges energy with, and on rare occasions has sold energy to, Carolina Power & Light Company at Kingsport, Tennessee (where energy is transmitted and received over the lines of Tennessee Public Service Company) and at the Virginia-North Carolina boundary near Danville, Virginia. Mutual benefits result from these interconnections between the steam generating system of the Appalachian Electric Power Company and the predominantly hydro-electric system of the Carolina Company. The trans- 1808 1809

actions between the companies, consisting of both
1810 "concurrent" and "seasonal" interchange, permit the Appalachian Electric Power Company to operate its plants at a greater capacity factor by virtue of deliveries during off-peak hours and it benefits by the receipt of cheap hydro-electric energy. These movements across state boundaries, between the northern and southern portions of America Gas group and between the Appalachian Electric Power Company and the Carolina Power & Light Company, are reflected in the following analysis of the operations, irres-
1811 pective of the division of operations between the constituent companies, of the group in each of the respective states concerned, i. e. Kentucky, Tennessee, Virginia, and the part of the system (Appalachian Electric Power Company and the Kanawha Valley Power Company) in the southern part of West Virginia.

(7) Of the approximate total of 1,275 million kwh handled in the part of the system in southern *West Virginia* in 1934 (generated in the state 695 million kwh, purchased from non-associates in the
1812 state, none), approximately 580 million kwh or 46 per cent. was received and approximately 385 million kwh or 30 per cent. was transmitted across the West Virginia-Ohio, West Virginia-Kentucky, West Virginia-Tennessee, and West Virginia-Virginia boundaries. Of the approximate total of 184 million kwh handled in *Kentucky* in 1934 (generated in the state 38 million kwh, purchased from non-associates in the state, none) approximately 146 million kwh or 79 per cent. was received and

6 million kwh or 3 per cent. was transmitted across the Kentucky-Ohio, Kentucky-West Virginia, and Kentucky-Virginia boundaries. Of the approximate total of 348 million kwh handled in *Tennessee* in 1934 (generated in the state, none; received from Tennessee Public Service Company in the state 312 million kwh), approximately 312 million kwh or 90 per cent. was transmitted and 36 million kwh or 10 per cent. was received across the Tennessee-Virginia boundary. Of the approximate total of 873 million kwh handled in *Virginia* in 1934 (generated in the state 389 million kwh, purchased from non-associates in the state 9 million kwh), approximately 553 million kwh or 63 per cent. was transmitted and approximately 475 million kwh or 55 per cent. was received across the Virginia-West Virginia, Virginia-Kentucky, Virginia-Tennessee and Virginia-North Carolina (Danville) boundaries. 1813 1814

(8) Table B of Exhibit 111 contains further statistics of the group operations of the companies described in this section.

152. *The Scranton Electric Company* (Pennsylvania) 1815

A.

A map of the properties of this company is shown in Exhibit 113 (map no. 21).

B. *History*

1816

(1) The Scranton Electric Company, a Pennsylvania corporation organized in 1928, is successor to the original Scranton Electric Company organized in 1907, from properties acquired by original American Gas at its organization.

(2) In 1928, there was completed for The Scranton Electric Company and for Pennsylvania Power & Light Company, a subsidiary of National Company, at Stanton, Pennsylvania, a steam electric generating station, approximately one-half of which
1817 is owned by each of the two companies named, as described in section 150. 66 Kv transmission lines were constructed linking the Stanton Plant and the other steam electric generating station of the company at Scranton, and extending to and slightly beyond Peckville, at which points interconnections are made with transmission lines of the Pennsylvania Power & Light Company, extending to Hawley, in Pennsylvania, and with the transmission system of Northern Pennsylvania Power Company, a non-associate company, having generating plants
1818 and distribution systems in Pennsylvania, north of Scranton, and extending to the New York state boundary. The transmission and distribution facilities of the company are wholly within the state of Pennsylvania and none of them reach to nor approach any state boundary. The company's energy requirements are met practically completely by its plants at Stanton and Scranton. The only purchases are small amounts under old contracts from local companies or for one or two pieces of distribution line not physically connected with the company's principal system.

Stipulation of Facts

C. *Business and Operation*

1819

(1) Details as to the business and operations of the company are included in Table A, Exhibit 111. Generally, the business and operations of the company in 1934, were approximately as follows:

Business

Customers	78,612
Communities Served	25

Energy Sales—kwh

1820

To Ultimate Consumers	225,687,000
At Wholesale for Resale	1,438,000
Total Sales	227,125,000

Electric Revenues

From Ultimate Consumers	$ 5,731,200
From Wholesale Sales	33,600
Total Revenues	$ 5,764,800

1821

Operation—kwh

Generation	257,218,000
Purchases	676,000
Total available in state	257,894,000

(2) The sales of the company consist almost exclusively of retail distribution to ultimate con-

sumers in four counties, in northeastern Pennsyl-
1822 vania. The sales at wholesale for resale were to small distribution companies serving a few neighboring communities or were small sales in Pennsylvania of surplus energy to interconnected companies. The company makes no sales at or near any state boundary.

153. *Atlantic City Electric Company* (New Jersey)

A.

A map of the properties of this company is shown
1823 in Exhibit 113 (map no. 21).

B. History

(1) Atlantic City Electric Company, a New Jersey corporation organized in 1924, is successor to the original Atlantic City Electric Company, formed in 1907 by original American Gas from properties acquired at organization. Additional properties were acquired and transmission lines constructed to interconnect them.

1824 (2) In the period around 1925, the Electric Company of New Jersey, serving the westerly half of southern New Jersey, was acquired by the American Gas and in 1927 its properties were transferred to Atlantic City Electric Company.

(3) In 1930, there was completed the construction for Atlantic City Electric Company and other non-associate interests (now Deepwater Light and Power Company) a steam electric generating sta-

tion at Deepwater Point, on the Delaware River, in the State of New Jersey. Atlantic City Electric 1825
Company owns substantially one-half of the complete plant and normally obtains the major part of its energy requirements from the equipment owned by it in the plant at that point. The arrangement for joint operation of the plant at Deepwater provides that each owner is entitled to the use of his own equipment and any part of the other owner's capacity not in use by it. The Deepwater Plant and the company's other generating plant from which it obtains the rest of its energy requirements, located at Atlantic City, are interconnected by 66 kv lines. The company's transmission and distribution lines are wholly within 1826
the State of New Jersey and do not reach the state boundary, the only interconnection with another system being through the jointly operated plant at Deepwater in New Jersey.

C.

(1) Details as to the business and operations of the company are included in Table A, Exhibit 111. Generally, the business and operations of the company in 1934, were approximately as follows: 1827

Business

Customers	84,869
Communities Served	233

1828

Energy Sales—kwh	
To Ultimate Consumers	162,832,000
At Wholesale for Resale	2,438,000
Total Sales	165,270,000
Electric Revenues	
From Ultimate Consumers	$ 6,433,900
From Wholesale Sales	31,800
Total Revenues	$ 6,465,700

1829

Operation—kwh	
Generation	204,238,000
Purchases	....
Total available in state	204,238,000

(2) The sales of the company hereinabove described consist almost exclusively of retail distribution to ultimate consumers throughout southern New Jersey. It makes wholesale sales to one customer for resale. The company does not pur-
1830 chase any energy, and none of its energy moves across state boundaries.

ARTICLE XX

1831

GENERAL DESCRIPTION OF PHYSICAL OPERATION OF GAS PROPERTIES

154. *Definitions*

Companies which sell gas obtained by the conversion of energy existing in material in solid or liquid form to that existing in material in gaseous form by physical or chemical processes are referred to as manufactured gas companies, and companies which sell natural gas are referred to as natural gas companies. There are also gas com- 1832
panies, which sell a mixture of both types of gas, but published statistics usually classify them as manufactured gas companies.

155. *Production, Transportation and Distribution*

A. In its physical aspects, the gas business consists of three interrelated and continuous processes:

1. *Production*: The conversion of the energy from the form in which it exists in solid or liquid 1833
fuels into the gaseous form of manufactured gas or the recovery of natural gas from underground reservoirs;

2. *Transportation*: The conveyance of the gas through pipe lines to the communities served or distribution centers; and

3. *Distribution*: The further delivery to the consumer of the gas thus produced and conveyed.

1834 B. Pressure regulation, to control well pressure where this proves necessary in the production of natural gas, increase in pressure in order to transport natural or manufactured gas through pipe lines and pressure reduction at appropriate places in the system to bring the pipe line pressure to one suitable for distribution and use are involved in the above processes. Other incidental processes such as the conditioning of gas to remove impurities, etc., so that the gas may be in a form suitable for transportation, distribution and use, are involved.

1835 C. It is essential that natural gas be produced, transported and distributed in one continuous operation as required by the fluctuating demands imposed upon the utility system by consumers. In the natural gas business, it is not the practice to store gas, except by "packing" the pipe lines themselves, and normally the producing capacity of the gas field, the capacity of the transportation mains, and distribution systems, must be adequate to supply the maximum demands of consumers whenever they may occur. In the manufactured gas
1836 business, it is the practice to provide storage facilities, and such facilities often amount to as much as one day's requirements.

D. In individual systems, there are numerous variations in the form and importance of the functions of production, transportation and distribution. Historically, the gas utility business was carried on by the manufactured gas company with its plant and distribution system located in the community served. In certain cases, extensive

transportation systems have been developed, but the manufactured gas utility remains essentially local in operation. Since 1900 the natural gas business has developed rapidly, the greatest expansion having occurred since 1920, and has in many communities superseded manufactured gas. Statistics of the American Gas Association for 1934 show that natural gas utilities sold a volume of natural gas (which per cubic foot has practically twice the heat content of manufactured gas) which was almost three times the volume of manufactured gas sold. 1837

156. *Field Use of Natural Gas* 1838

In the natural gas business, much gas is produced which is not used in the utility business. Natural gas is often produced as an incident to oil operations, and the field use of gas in oil and gas producing operations is substantial. Likewise, certain industries, primarily those engaged in the carbon-black business, have been attracted to the vicinity of gas fields and, themselves, normally produce the gas used in their business. On the basis of statistics compiled by the United States Bureau of Mines for 1934, it is estimated that approximately 785 billion cubic feet of natural gas, or about 45% of the total produced, was used in the course of such non-utility operations. Little transportation is involved in putting such gas to use. 1839

157. *Transportation of Natural Gas*

1840 Transportation is important in the handling of the natural gas sold in the course of utility operations. Since the known natural gas supply is localized in specific producing fields, the major ones being located far from large residential and industrial centers, extensive pipe line networks are a pre-requisite of successful utilization. At the present stage in the art of pipe line construction and of long distance transportation, the distance to which gas may be transported is limited primarily by its value at destination. Natural gas is
1841 now transported up to 1,000 miles. There are approximately 53,000 miles of natural gas trunk pipe lines in the United States. At the present time, natural gas produced in gas fields in northeastern Louisiana is delivered to Atlanta, Georgia, to Memphis, Tennessee, to St. Louis, Missouri, and to Ft. Worth, Texas. Natural gas produced in the gas field in the north Texas panhandle is transmitted to Cheyenne, Wyoming, Chicago, Illinois, Minneapolis and St. Paul, Minnesota, and at the present time steps are being taken to deliver it to
1842 Detroit, Michigan. Pipe lines not only radiate from a gas field in different directions in search of markets, but, as the producing ability of a field declines, new fields must be found and tapped by extending the transportation system. In the many cases, a natural gas system connects with and obtains gas from more than one field.

158. *Movement Across State Boundaries*

A. Precise data are not available as to the amount of natural gas sold at retail to residential,

commercial and industrial consumers in the United States. However, a total for the natural gas utility business and a total of such gas which is consumed in a state other than that in which it is produced may be arrived at on the basis of figures compiled by the United States Bureau of Mines. Gas handled in the utility business is computed by excluding from national consumption the amount of field and carbon black use. The following is a table of figures thus compiled: 1843

Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
		In billions of cubic feet						
1927	1445	144	549	693	752	194	25.8	13.4
1928	1568	175	574	749	819	241	29.4	15.4
1929	1917	261	705	966	951	325	34.2	17.0
1930	1942	267	723	990	952	381	40.0	19.6
1931	1684	196	571	767	917	333	36.3	19.8
1932	1554	168	529	697	857	331	38.6	21.3
1933	1553	190	491	681	872	347	39.8	22.4
1934	1765	230	555	785	980	414	42.2	23.4

1844

(a) Total Consumption
(b) Amount Used for Manufacture of Carbon-Black. 1845
(c) Amount Consumed in Field Uses
(d) Total of (b) and (c)
(e) Amount sold for ultimate consumption by Residential and Industrial Consumers
(f) Amount Consumed in State other than State of Production
(g) (f) in percent of (e)
(h) (f) in percent of (a)

1846 The figures as to amount consumed in states other than those in which produced do not include the gas which moves out of a state and back into it, and count only once the quantity of gas which moves across more than one state line in its course from state of origin to state of destination.

B. Although accurate statistics as to the interstate movement of manufactured gas are not available, it is apparent that such movement of gas for use in the utility business is insignificant in proportion to the total sold to utility customers. On the
1847 basis of data compiled by the Federal Trade Commission (70th Cong., 1st Sess. Senate Doc. 92, Part 72-A, page 50) it is estimated that in 1930 the interstate movement of manufactured gas amounted to approximately 6 billion cubic feet out of total utility sales of 400 billion cubic feet, or about 1½%.

C. Gas transported from producing wells in one state to points of use in a second state is frequently commingled in the same pipe lines with gas produced within the second state. Pipe lines which cross state boundaries are frequently tapped
1848 between the producing wells and the ultimate destination of use. Where such pipe lines cross state boundaries they may be so tapped both in the producing state and in the state of destination. Such taps may be for delivery at wholesale for resale, or for deliveries at retail to residential, commercial or industrial consumers.

Stipulation of Facts

159. *Pressure Regulation*

1849

In the absence of sufficient natural well pressure, the pressure at which gas is transported must be provided by mechanical means, and, if necessary such pressure must be restored at appropriate successive points on the pipe line system, in order to overcome the effects of friction, and may be changed at points where secondary transportation lines tap the trunk lines or for other reasons. The high pressure under which gas is transported is reduced to lower pressure for distribution at or near the point of consumption (usually at the so-called "city gate" or at or near the points of industrial use). 1850 At different points in the distribution system, there is usually at least one further change in the original distribution pressure before delivery to the consumer. Such reductions in pressure are accomplished by the transportation company where it also distributes directly to consumers. Where the transportation company sells gas at wholesale for distribution to consumers by an affiliated, associated or independent company, the first reduction in pressure is usually accomplished by the transportation company, further reductions in pressure being made by the distribution company. 1851 Where the transportation company sells gas from the main pipe line to industrial consumers, the first reduction in pressure is usually accomplished by the transportation company and further reductions in pressure are accomplished by the consumer.

160. *Distribution*

1852 Distribution is accomplished through distributing pipe lines which radiate from the "city gate" or other center of distribution throughout the distribution area, leading to burner tips of the consumer at which the gas is consumed. A single company, or its subsidiaries or associates, may serve consumers in many cities and towns in one or more states by separate distribution systems serving such cities and towns, with gas imported into the state, or produced within the state, or with commingled gases from sources of supply located 1853 both within and without the state.

161. *Interconnections; Transportation for Account of Others*

In the manufactured gas business, the processes of production, transportation, and retail distribution are normally under the control of one company or of one group of companies affiliated through a common holding company. However, in the natural gas business, companies owning pipe lines frequently purchase a large part of their 1854 requirements from independent producers and sometimes do not control many of the companies which distribute at retail gas which they transport. Where different operating companies carry on different processes in the necessarily continuous operation of a natural or manufactured gas system, physical interconnection between the separate systems as well as the close cooperation of the operating staffs of the companies concerned are essential. Transportation for the account of others, whether between affiliated or non-affiliated companies, is not unusual. Likewise one company may

sell gas at one point and purchase an equivalent amount of gas at another point on its system, thereby effecting the transfer of gas by means of the line of another company, from one part of its system to another. On the other hand, there are only two systems known to the parties to this stipulation which function as common carriers (i. e., a carrier which holds itself out to transport gas for all comers within the limits of its capacity) and they are unimportant. Gas pipe lines are built for a definite capacity which is related to the present and potentially contemplated markets which they serve. If their primary obligations to their markets or their existing contracts remain in force, they cannot, without enlargement or readaption of their lines, assume the obligations of common carriers except to the extent that they have available capacity over and above such requirements. As noted, however, it is common practice among pipe line companies to purchase a substantial portion of their requirements from independent producers. Interconnection between different integral pipe line systems, except where they are to be fused into one system in order to pool the source of supply or to reinforce transportation capacity along functionally identical routes, is infrequent.

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162. *Relation to Electric Service*

In many communities throughout the country the same company or companies under common holding company control distribute both gas (natural or manufactured) and electric energy at retail. These services are substantially non-competitive in the lighting field but are competitive in the fields of cooking, heating and refrigeration.

1858

ARTICLE XXI

PROPERTIES AND PHYSICAL OPERATIONS OF THE GAS COMPANIES IN THE SYSTEMS OF THE HOLDING DEFENDANTS

163. *General Statement*

A. The gas companies subsidiary to American Company, National Company and Electric Company operate in 15 states of the United States and in the Republic of Mexico. The producing properties embrace approximately 1,500,000 acres of gas leases. The systems own or control more than 6,000 miles of main pipe line used in the transporation of gas, serve in excess of 450,000 customers, and the yearly production and purchases amount to more than 213,000 million cubic feet of natural and manufactured gas. In respect to the production, transportation and distribution of gas in the United States, the aggregate business of these companies ranks among the first of the gas holding company systems of the country.

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B. Exhibit 114 is a map, as of 1935, showing generally the natural and manufactured gas facilities of these companies which consist of the following systems:

(1) United Company group system producing, purchasing, transporting, and distributing natural gas in parts of Texas, Louisiana, Mississippi, Alabama, Florida and extending into the Republic of Mexico, operated by United Gas Public Service

Company, Houston Gulf Gas Company, and their subsidiaries. This system also furnishes directly or 1861
indirectly, all or part of the natural gas sold by Arkansas Power & Light Company, Mississippi Power & Light Company, Louisiana Power & Light Company, New Orleans Public Service Inc., Memphis Power & Light Company, and West Tennessee Power & Light Company.

(2) A manufactured gas system in Oregon which extends into Washington, operated by Portland Gas & Coke Company.

(3) A manufactured gas system, receiving gas 1862
at the Wisconsin-Minnesota boundary and distributing it in Wisconsin, operated by Superior Water, Light and Power Company.

(4) A natural gas distribution system in Arizona operated by Central Arizona Light and Power Company which receives gas transported from New Mexico.

(5) Manufactured gas systems in Florida operated by Florida Power & Light Company.

1863

(6) Natural and manufactured gas systems in Pennsylvania operated by Pennsylvania Power & Light Company and its subsidiaries.

(7) A natural gas system in Montana operated by The Montana Power Company and Montana Power Gas Company.

C. As hereinafter described, the four first above
1864 mentioned systems handle (i.e. produce and receive, or, transport, or, distribute and deliver) gas which, in whole or in part, crosses state boundaries, and the three last above mentioned systems handle only gas which does not cross state boundaries. Out of an approximate aggregate total of 213,000 million cubic feet of natural and manufactured gas handled by all of the systems above referred to in 1935, the four first above mentioned systems handled approximately 198,000 million cubic feet of which 91,000 million cubic feet, or 46%, was
1865 transported across state boundaries.

D. In the statement of the foregoing figures, all duplications involved in inter-company transactions between subsidiaries of American, National and Electric Companies (including cases in which a non-associate transports or transfers gas between parts of an interconnected system of such subsidiaries) are eliminated.

E. Exhibit 115 is a list of the retail distribution centers in which the above mentioned companies dis-
1866 tribute gas, indicating those centers in which electric energy is likewise distributed at retail by the same company or by another subsidiary of American, National or Electric Company.

164. *United Company Group* (and associate Companies)

Exhibit 116 (map no. 1) is a map of the United Company group, showing (1) the system of United Gas Public Service Company, Houston Gulf Gas

Company (holding-operating defendants, subsidiaries of United Company), and their subsidiaries (this system being hereinafter referred to as the United Gas system), and (2) distribution facilities of Arkansas Power & Light Company, Mississippi Power & Light Company, Louisiana Power & Light Company, New Orleans Public Service Inc. (subsidiaries of Electric Company which are not subsidiaries of United Company), Memphis Power & Light Company and West Tennessee Power & Light Company (subsidiaries of National Company), which companies distribute at retail gas produced or transported in whole or in part by the United Gas System as hereinafter described. The map also shows the pipe lines of certain other companies, hereinafter noted, which transport gas produced by the United Gas System, as well as gas produced by others. 1867 1868

A. HISTORY

(1) Prior to the organization of United Company in 1930, Louisiana Gas & Fuel Company and New Orleans Public Service Inc. (Electric Company subsidiaries) and Memphis Power & Light Company, and West Tennessee Power & Light Company (National Company subsidiaries) owned and operated gas facilities as shown on Exhibit 116 (map no. 1). The properties of Louisiana Gas & Fuel Company were later acquired by United Gas Public Service Company. The facilities of the New Orleans Company were tied in with gas properties in Northern Louisiana, which were subsequently acquired as part of the United Gas system, through lines of the non-associate Interstate Natural Gas Company, Inc. The fa- 1869

cilities of the Memphis Company were similarly tied in with the gas properties in Northern Louisiana, which were subsequently acquired as part of the United Gas system, through the line of Memphis Natural Gas Company (approximately 16.3% of the voting securities of which were then and are now owned by National Company). Likewise, a pipe line of the non-associate Arkansas-Louisiana Gas Company connected certain pipe lines in Texas with production facilities in northeastern Louisiana, which properties in Texas and Louisiana were subsequently acquired as parts of the United Gas system.

(2) About the time of the formation of United Company, or shortly prior thereto, Louisiana Power & Light Company developed retail distribution facilities at several points in Louisiana, which were tied in directly or indirectly with the United Gas system; the Mississippi Power & Light Company developed retail distribution facilities at several points in Northern Mississippi which were tied in indirectly with the United Gas system through the aforesaid Memphis Natural Gas Company; and the Arkansas Power & Light Company likewise developed retail distribution facilities at several points in Arkansas, which were tied in indirectly with the United Gas system through pipe lines of Mississippi River Fuel Corporation (approximately 46% of the voting securities of which were then and are now owned by United Company) and through the pipe lines of the aforesaid Memphis Natural Gas Company.

(3) United Company was organized in 1930 for the purpose of consolidating and welding into a 1873
unified interconnected system a large number of natural gas pipe lines and other facilities located in Louisiana and Texas and extending into the Republic of Mexico. The original properties acquired in 1930 were (with the exception of (1) the system in southwestern Louisiana and (2) the system in Mississippi which also extends into southeastern Louisiana, Alabama and Florida) essentially as shown on the map above referred to insofar as pipe lines across state boundaries are concerned. The constituent properties had been largely 1874
built up and operated as separate physical units, but since the organization of United Company, the separate units in the United Gas system have been operated by a single organization as a unified system. The pipe line system in Mississippi which extends into Alabama and Florida was later acquired. This line is indirectly tied in with producing properties in Northwestern Louisiana of the United Gas system through a pipe line of the nonassociate Southern Natural Gas Corporation. A branch from this Mississippi line was built into southeastern Louisiana where the Louisiana Power 1875
& Light Company developed retail distribution facilities at various points; and a pipe line network was extended from Texas throughout southwestern Louisiana where distribution facilities were developed. Upon its organization, United Company acquired and until recently owned (the securities were disposed of since the inception of this suit as stated in Exhibit 38) directly and indirectly approximately 27% of the outstanding voting se-

curities of El Paso Natural Gas Company, which
1876 company obtains natural gas in New Mexico, transports and distributes in western Texas, New Mexico, Arizona and Mexico, and transports gas into Arizona where it supplies all the natural gas requirements of Central Arizona Light and Power Company (American Company subsidiary).

(4) At the present time, the United Gas system includes gas fields located in four separated producing areas: Monroe, Richland and Rodessa in northern Louisiana, Amarillo in the Texas Pan-
1877 handle, Refugio and Bruni in southern Texas, and a field near Jackson, Mississippi. There are four separate major pipe line systems; (1) The system extending from Mexico throughout Texas, northern and southern Louisiana; (2) the system in Texas extending from the Panhandle field which at one point crosses the corner of Oklahoma; (3) the system from Baton Rouge to New Orleans; and (4) the system in Mississippi which extends into southeastern Louisiana, Alabama and Florida. However, with the exception of the Panhandle network, the United Gas pipe lines, in conjunction
1878 with lines of other companies with which transportation agreements are in force, in fact form one interconnected system.

B. United Gas Public Service Company—Houston Gulf Gas Company

(1) The map (Exhibit 116; map no. 1) includes the properties of these two companies and of their subsidiaries which form the United Gas system. Houston Gulf Gas Company is a subsidiary of United Gas Public Service Company.

(2) United Gas Public Service Company (a Delaware corporation) was organized in 1930 as 1879
the principal operating subsidiary of United Company. It took over all of the properties owned by United Company directly or through 100% owned subsidiaries and now owns directly the major portion of all the properties constituting the United Gas system. It also took over the investments of United Company in a number of other companies which had securities outstanding in the hands of the public and which are presently subsidiaries of United Gas Public Service Company, operating parts of the United Gas system. It transports gas through its own pipe lines across the 1880
Alabama-Florida, Mississippi-Alabama, Mississippi-Louisiana, Louisiana-Texas, Texas-Republic of Mexico boundaries; and its subsidiary, Northern Texas Utilities Company, transports gas across the Texas-Oklahoma boundary.

(3) Houston Gulf Gas Company (a Delaware corporation was organized in 1925 to build a pipe line from the Refugio area in south Texas to the City of Houston, where an independently owned manufactured gas system was in operation. In 1881
1928, Houston Gulf Gas Company acquired the distribution system in Houston which has continued operation as a subsidiary of Houston Gulf Gas Company. Through contracts between Houston Gulf Gas Company and predecessors of United Gas Public Service Company, part of the gas supply for Houston Gulf Gas Company and its subsidiary, Houston Gas and Fuel Company (a Texas corporation), is received near Houston from the gas

1882 fields of Northern Louisiana through the facilities of United Gas Public Service Company. The gas received by the two Houston companies from the gas fields of northern Louisiana is intermingled with gas received by them from fields in Texas prior to their receipt of such gas, and by reason of such intermingling it is impossible to determine what portion of the total receipts of the Houston companies comes from a source in Louisiana and what portion thereof comes from a source in Texas.

1883 C. BUSINESS AND OPERATION OF UNITED GAS SYSTEM

(1) The division by states of the aggregate natural gas business of United Gas system and its subsidiaries in the year 1935 may be indicated approximately as follows:

	Production and/or Purchase	Sales at Retail or Wholesale	Operating Revenues from gas sales
Texas	59,050,000 Mcf	72,000,000 Mcf	$13,880,000
1884 Louisiana	126,250,000	98,530,000	7,840,000
Mississippi	8,405,000	4,440,000	630,000
Mexico	195,000	6,130,000	680,000
Alabama	—	560,000	190,000
Florida	—	730,000	130,000
Total	193,900,000 Mcf	182,390,000 Mcf	$24,000,000

(2) Of the total produced and purchased, 67,303 million cubic feet, or 35%, was sold by the United Gas System or others in states other than the state

of origin and an additional 22,502 million cubic feet or 12%, was transported out of the state of origin by United or others and was subsequently transported back into and sold in the state of origin. Of the total produced and purchased by United and its subsidiaries, 37,263 million cubic feet, or 19%, was sold by United and its subsidiaries in states other than those in which it is produced or purchased. Of the latter total, United Gas System itself transported through its own pipelines across state or international boundaries for sale in a state (or in Mexico) other than that in which the gas was produced or purchased approximately 23,617 million cubic feet, or 12.2% of the total produced and purchased. 1885 1886

(3) The operations of the United Gas system in the various states served are generally as follows:

Operations in eastern and southern Texas and Mexico—Gas from the south Texas fields is piped to and sold at wholesale or retail by the United Gas system in and near Monterey, Mexico, and Laredo, San Antonio, Austin, Houston and numerous small communities in Texas. In 1935, approximately 6,706 million cubic feet of gas thus produced were transported by the United Gas system from Texas into Mexico. In order to supplement the supply in Texas, gas produced in northern Louisiana is imported through a United Gas system line and also through a line of the non-associate Arkansas-Louisiana Gas Company under an arrangement with the latter whereby mutual sales and purchases in Louisiana and Texas are offset. The total quantity so im- 1887

ported in 1935 was approximately 27,577 million
1888 cubic feet, of which about one-half was transported through the United Gas system line and one-half through the line of the Arkansas-Louisiana Gas Company. This imported gas is sold at wholesale and retail by the United Gas system in Fort Worth, Dallas, Beaumont, Houston and other points in Texas, and is also sent back into Louisiana to meet the demands in the portion of the United Gas system in southwestern Louisiana. The volume of gas thus sent back into Louisiana in 1935 was approximately 1,328 million cubic feet.

1889 Of the 80,643 million cubic feet estimated total of gas handled in 1935 by that portion of the main interconnected United Gas system located in eastern and southern Texas (i.e. exclusive of the Panhandle system), approximately 27,527 million cubic feet, or 34%, was imported from Louisiana and 8,034 million cubic feet or 10 percent, was exported into Mexico and Louisiana.

Operations in northern Texas—It is estimated that of the total volume produced and purchased by United Gas system in Texas Panhandle, 2,741
1890 million cubic feet, or 44 per cent, is transported across Oklahoma on its way to markets in northern Texas. Gas from this source is sold by the United Gas system at wholesale and at retail in several communities in northern Texas, and a small amount is sold at wholesale in Texas to non-associates which transport and distribute it in Oklahoma.

Operations in Louisiana—Gas produced or purchased by United Gas system in the northern Louisiana fields is distributed by it throughout

northern Louisiana and, as above described, is transported through Texas into the southwestern Louisiana territory. Much of the gas from these fields, however, is sold at wholesale by the United Gas system to other pipe line companies. From these fields United Gas system supplies a substantial proportion of the requirements, under long term agreements of (1) Memphis Natural Gas Company, which operates a pipeline extending from Louisiana through Arkansas and Mississippi to Tennessee (approximately 17% of the outstanding voting securities of which company are owned by National Company); (2) of the non-associated Southern Natural Gas Corporation, which owns a pipe line extending from Louisiana to Atlanta connecting with the terminus of United Gas system's Mississippi-Florida network at Benton, Mississippi; (3) of the non-associate Interstate Natural Gas Company which transports gas for the the account of the United Gas system from northern Louisiana across the corner of Mississippi to Baton Rouge, Louisiana; and (4) of Mississippi River Fuel Corporation, which owns a pipe line extending from Louisiana through Arkansas to Missouri (approximately 46% of the outstanding voting securities of which company are owned by United Company) and (5) of the non-associate Arkansas-Louisiana Gas Company which owns a natural gas pipe line system operating in Louisiana, Arkansas, and Texas.

A substantial part of the natural gas requirements of the Louisiana Power & Light Company and New Orleans Public Service Inc. in Louisiana, Arkansas Power & Light Company in Arkansas,

Mississippi Power & Light Company in Mississippi
1894 (all Electric Company subsidiaries), Memphis Power & Light Company and West Tennessee Power & Light Company in Tennessee (both National Company subsidiaries), are supplied by gas originally produced or purchased by the United Gas system in the northern Louisiana fields and transported by it or by the above described pipe line companies. The 1935 statistics as to gas handled by the United Gas system in *Louisiana* are as follows:

(a) Of the estimated total of 122,103 million
1895 cubic feet of gas handled in 1935 by that portion of the main interconnected system in northern Louisiana, approximately 55,939 million cubic feet or 46% is exported from Louisiana by the United Gas system or by other above described pipe lines.

(b) All the estimated total of 3,014 million cubic feet of gas handled by the portion of the Mississippi-Florida system located in southeastern Louisiana was imported.

(c) Of the estimated total of 5,474 million cubic
1896 feet of gas handled by the portion of the main interconnected system in southwestern Louisiana 1,328 million cubic feet or 24% was imported. All of this gas originates in northern Louisiana, passes through Texas on its way back to Louisiana, and is included among the Texas imports, set forth above.

(d) All of the gas handled by the Baton Rouge-New Orleans pipe line, estimated at 18,433 million

cubic feet, came across the corner of Mississippi from the northern Louisiana fields. 1897

Operations of the Mississippi-Florida system—Of the estimated total of 8,405 million cubic feet handled by this system in 1935, approximately 4,307 million cubic feet or 51% was exported from Mississippi into southeastern Louisiana (also included in Louisiana operations above), Alabama, and Florida. Excluding the southeastern Louisiana deliveries shown in (b) above, 1,293 million cubic feet of gas, or 15% of said 8,405 million cubic feet handled by this system, was exported by this system into Alabama and Florida. 1898

The United Gas system has an arrangement with the Southern Natural Gas Company whereby it may supplement its Jackson, Mississippi field supply to meet the requirements of the Mississippi-Alabama-Florida system by furnishing gas in northern Louisiana for transportation to Benton, Mississippi, where Southern Natural's main line interconnects with United's Mississippi-Florida line. Practically no gas has been transported under this arrangement to date.

165. *Portland Gas & Coke Company* 1899
(Oregon and Washington)

Exhibit 116 (map no. 2) contains a map of properties of this company as of 1935. In 1910 when Portland Gas & Coke Company (an Oregon corporation) was organized and its securities were acquired by American Company its properties consisted of manufactured gas plants, transportation mains and distribution systems located solely within the State

of Oregon. Since its organization, the Company has
1900 acquired additional gas utility properties and has made substantial additions to its own generating, transportation and distribution facilities all located solely within the State of Oregon, except for an extension of its distribution system across the Oregon-Washington boundary line for the purpose of serving customers of the Company in one community in the State of Washington.

The principal office and place of business of Portland Gas & Coke Company is in Portland, Oregon. Its sales consist primarily in the sale of
1901 gas at retail to ultimate consumers in Oregon and Washington. In 1934, its sales of gas at retail were approximately 2,500,000 thousand cubic feet to approximately 80,000 consumers residing in and near 80 communities in the State of Oregon from which it derived approximately $2,600,000 in revenues, and 58,000 thousand cubic feet to approximately 2,000 consumers in one community in the State of Washington, from which it derived approximately $63,000 in revenues. The gas which the Company transported across the Oregon-Washington boundary and sold in the latter state was
1902 approximately 2.3% of the aggregate amount of its gas sales in Oregon.

166. *Superior Water Light and Power Company*
(Wisconsin)

The gas property of this company consists of distribution facilities located within the state of Wisconsin serving the city of Superior. The source of supply of gas is the coke oven plant of the non-associate Interlake Iron Corporation, in Minne-

sota, near Duluth. The gas is delivered by Interlake Iron Corporation to Superior Water, Light and 1903
Power Company at the Minnesota-Wisconsin boundary. In 1935 the sales of gas at retail to ultimate consumers were approximately 227,130 thousand cubic feet to approximately 7,630 customers, from which the Company derived approximately $226,560 in revenues.

167. *Central Arizona Light and Power Company*
(Arizona)

The gas properties of this Company consist of generating facilities in Phœnix and distribu- 1904
tion facilties serving the City of Phœnix and the towns of Glendale and Tempe and adjacent territories, all located within the State of Arizona. In 1934 natural gas became available through the construction of an extension to the lines of the El Paso Natural Gas Company and since that time natural gas has been distributed by Central Arizona Light and Power Company. The principal source of the natural gas supply is the Lea County, New Mexico, fields. The gas is transported by El Paso Natural Gas Company and its sub- 1905
sidiaries from New Mexico across Western Texas into Arizona and delivered to Central Arizona Light and Power Company at the city gates of the communities served. In 1935 the Company's sales of gas at retail to ultimate consumers were approximately 671,340 thousand cubic feet to approximately 11,840 customers from which it derived approximately $675,500 in revenue.

168. *Florida Power & Light Company*
(Florida)

1906 The gas properties of this company consist of production and distribution facilities located in and serving the communities of Miami, Daytona Beach, Palatka and Lakeland, Florida. Its gas sales consist in the sale of manufactured gas at retail to ultimate consumers residing in or near those communities, all located within the State of Florida, from which, in 1935, it derived approximately $750,900 in revenues from the sale of approximately 432,350 thousand cubic feet to approxi-
1907 mately 15,760 consumers.

169. *Pennsylvania Power & Light Company*
(Pennsylvania)

The gas properties of this company and its subsidiaries consist of production facilities located in the natural gas fields in northern Pennsylvania, transportation facilities from those fields to the communities served with natural gas and distribution facilities in those communities, together with gas manufacturing plants, transportation facilities and
1908 distribution facilities for manufactured gas in those communities served with manufactured gas. Since the organization of Pennsylvania Power & Light Company, it has made substantial additions to its manufactured gas properties and has acquired and constructed (directly or through subsidiaries) facilities for the production, transportation and distribution of natural gas, all located within the state of Pennsylvania. The gas sales of Pennsylvania Power & Light Company consist of the sale of manufactured and natural gas at retail to ultimate consumers residing in and near 34 com-

munities in Pennsylvania. In 1935 its sales of manufactured gas were approximately 916,580 thousand cubic feet to approximately 36,200 customers in 21 communities from which it derived approximately $1,236,750 in revenues and its sales of natural gas were approximately 385,450 thousand cubic feet to approximately 16,260 customers in 13 communities from which it derived approximately $659,810 in revenues. 1909

170. *The Montana Power Company and Montana Power Gas Company* (Montana)

Montana Power Gas Company (a New Jersey corporation) is engaged in the production and transportation of natural gas and The Montana Power Company is engaged in its distribution throughout territory in central Montana in which the latter also distributes electric energy. 1910

Montana Power Gas Company was organized in 1932 and acquired the facilities by which gas is transported from Cut Bank field and Dry Creek field, both in Montana, to the city gates of the 15 communities served by The Montana Power Company. The principal offices and places of business of both these companies are in Butte, Montana. In 1931 natural gas was first delivered by the companies in this group and since that time has been distributed by The Montana Power Company. The sources of supply are the two fields above mentioned. In 1935, sales of gas produced and purchased by Montana Power Gas Company and distributed by The Montana Power Company were approximately 7,367,800 thousand cubic feet to 12,660 ultimate consumers, from which revenues of $2,045,100 were derived. 1911

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